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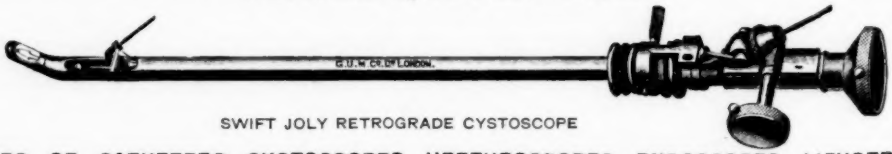

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LECTURE I.

(Delivered on May 16th.)

THE behaviour of the blood-sugar curve following the ingestion of soluble carbohydrates indicates that absorption must start at once. Under ordinary conditions none of this seems to occur in the stomach itself, as far as can be judged by chemical analysis, either of solutions of sugar left for some time in the viscus after ligation at the pylorus or of the chyme as this is discharged into the duodenum. Absorption of sugar takes place mainly in the upper levels of the small intestine, and different types of experiment have been employed to study the process. The oldest of these consists in placing known amounts of sugar in solution in isolated loops of intestine (Thiry-Vella) and then removing and analysing the contents after varying periods of time. The chief objection to this method depends on the fact that only an isolated portion of the entire gut is employed, an objection which is overcome in the method recently introduced by Cori and Cori,[1] in which the entire gastro-intestinal tract of small animals, such as the white rat, is used. The animals, kept for some time previously on a standard diet, are starved either for 24 or 48 hours, after which 2 or 3 c.cm. of a strong solution of sugar is placed in the stomach through a small flexible catheter passed by way of the mouth. The rate of absorption is ascertained by subtracting, from the amount of sugar that was given, the amount found by analysis of the gastro-intestinal contents after killing the animals at varying periods. Cori and Cori state that, when sufficient is given, the amount of sugar absorbed is constant from hour to hour, at least up to four hours, and they define as the coefficient of absorption that number of grammes of sugar absorbed per 100 g. of body-weight per hour. This is characteristic for each sugar, but it varies according to the time the animal was starved prior to giving the sugar. It is independent of the strength of the sugar solution.

For the monosaccharides the coefficients are given as follows: After 48 hours' starvation *d*-galactose 0·196 g., *d*-glucose 0·178 g., *d*-fructose 0·077 g., *d*-mannose 0·034 g., *l*-xylose 0·028 g., and *l*-arabinose 0·016 g. After 24 hours' starvation the coefficient for glucose is 0·266 g. These figures show a high degree of selectivity, dependent not at all upon molecular weight but markedly so on the structure of the molecule. Thus, the pentoses are absorbed at about one-eighth the rate of the better-known hexoses, and the slight stereoisomeric difference between glucose and mannose makes a marked difference. These results stand out in sharp contrast with those obtained for the rate of absorption from the peritoneal cavity, as determined on mice by C. F. Cori and Goltz.[2] In this case the sugar was absorbed at a diminishing rate with time, indicating that the concentration affects the process, and different sugars were absorbed at equal rates. When injected intravenously, different sugars were also found, by analysis of the so-called free sugar of the tissues, to be absorbed very rapidly and at equal rates into the liver and into the muscles, although it took a shorter time for equilibrium between blood and liver to be attained than between blood and muscles dependent probably on differences in the richness in blood-supply.[3]

I have only instanced a few of the numerous results which these workers have placed on record, but they are sufficient to show that the intestinal mucosa is endowed with a very highly specialised selective action, which is absent in the case of certain other absorbing membranes. It seems remarkable that bacterial decomposition should not account for a measurable fraction of the sugar which disappears from the intestine during four hours and that the concentration of the solution should not affect the rate of absorption. Cori and Cori state that no significant amount of glucose disappears when a solution of it is placed in the excised gastro-intestinal tract kept in isotonic saline solution at body temperature for four hours. At my request Magee and Auchinochie have repeated this experiment and on one or two occasions have been able to recover all the glucose. On other occasions, however, there were considerable deficits which may have been due to bacterial destruction or to incomplete washing of the sugar out of the walls of the gut. Is it not possible also that bacterial action might occur in the intact intestine, in situ, but be retarded or absent in the excised one? Corroboration or otherwise of the accuracy of the coefficients of absorption as given by Cori and Cori for different sugars would be most important since their subsequent researches, in which they compare the amount of sugar absorbed, on the one hand, with the amount that can be accounted for by combustion and glycogen formation on the other, depends on it. One also wonders whether the higher coefficients of absorption observed for rats starved 24 hours, as compared with those starved 48 hours, may not have been due to greater bacterial destruction in the former case. It may be added that another of the Cori's conclusions—namely, that the rate of absorption is independent, within wide limits of the sugar concentration, has been called in question by Pierce, Osgood, and Polansky.[4] These workers found, on repeating Cori's experiments, that the rate of absorption was less between the second and third hours than between the first and second. In a reply to this criticism, however, Cori, Cori and Goltz[5] point out that Pierce, &c., did not feed enough sugar to let the absorption proceed for three hours.

Although there may be reasons to doubt the reputed extreme accuracy of the coefficients, it is nevertheless certain that the striking differences observed cannot be mainly attributed to differences in the extent of destruction of the sugars by the bacteria of the intestine. That the hexoses are more readily absorbed than the pentoses has been confirmed by Magee and myself[6] in experiments of a different type from those of the Cori's. In these, we measured the rates of diffusion of equimolecular solutions of various sugars through the walls of isolated loops of rabbit's intestine, kept alive by being suspended in oxygenated Tyrode's solution.

The different sugar solutions were placed in neighbouring loops of approximately equal weight and small portions of the outside solutions were pipetted off at intervals for determination of the reducing power by the Shaffer-Hartmann method. It was found in preliminary experiments that diffusion proceeds through pieces of gut which had previously been killed, either by heat or by the action of sodium fluoride, much more rapidly than through the living gut and that, in equimolecular concentration, pentoses diffuse more rapidly than hexoses, being dependent solely on the concentration of the sugar solution. Through living segments on the other hand, glucose diffused as quickly as pentose, or in some experiments more quickly.

It is undoubted, therefore, that the intestinal mucosa absorbs hexoses more rapidly than pentoses, and I cannot resist wondering whether the former undergo some change in the process. That the blood-sugar may consist of some form of glucose which differs in configuration from a mixture of the α- and β-glucoses, has been suggested by various authors, without any evidence being adduced to support the suggestion. It has, however, generally been assumed that this change, if it occurs, depends either on a

preliminary conversion of glucose into glycogen or on the action of some hormone such as insulin, but is it not possible, as has been hinted at by various writers, that some change actually occurs in the glucose molecule while it is passing through the intestinal mucosa?

Interpretation of Changes in the Blood-Sugar.

It is not my intention here to enter further into the various interesting questions regarding intestinal absorption which await investigation by these methods, but, confining ourselves to the sugars, it may be of interest if I refer to the significance of the results which we have just been considering in connexion with the behaviour of the blood-sugar following carbohydrate ingestion. When this is observed in man at short intervals, after moderately small amounts of sugar have been taken in the post-absorptive state, very constant results are obtained, and it is considered that any unusual heightening or lengthening of the curve, which is obtained by plotting percentages of blood-sugar against time, is indicative of a diabetic tendency. Useful though this method may be as a clinical test, it should always be borne in mind that numerous factors enter in to influence the behaviour of the curves, for not only does this depend on the rate of intestinal absorption of the sugar, which again is dependent on many factors, but also on the rate at which the tissues utilise the sugar that is absorbed. This disposal may be influenced in several ways, and there is accumulating evidence to show that these are largely controlled by the concentration of insulin in the blood.

How complicated the matter really is may be illustrated by comparison of the blood-sugar curves following ingestion of fructose and glucose. The former sugar has a very small influence as compared with that of the latter and this is used clinically as a test of the efficiency of the liver, on the assumption that the difference depends on a rapid polymerisation of the fructose to glycogen in this organ. If Cori and Cori's results on rats apply in the case of man—namely, that fructose is absorbed at only half the rate of glucose—then it is possible that this may in itself account for the smaller influence which fructose has on the curve. But the problem is really a complex one, since galactose was found by the Cori's to be absorbed even more rapidly than glucose, whereas this sugar, according to Folin and Berglund,[7] has little influence on the blood-sugar level.

When the intestinal factor is eliminated, by injecting intravenously at a slow continuous rate, the tolerance towards sugar may be determined by observing whether any is excreted in the urine. By this method Sansum, Woodyatt, and Wilder[8] showed, several years ago, that 0·85 g. of glucose could be tolerated per kg. body-weight and per hour, both in man and laboratory animals. In the white rat (under amytal anæsthesia) and in the mouse, however, Cori and Cori state that the tolerance is three times as great (2·5 g. per kg.), except during the summer months when there is a lowered tolerance (1·6 g. per kg.) and this was found to be related to the development of a certain degree of ketonuria.

The Glycogen of the Liver.

Physiologists have become so familiar with the view that the glycogen of the liver represents a storage form of carbohydrate, that they have neglected to take notice of many well-established facts which indicate that it is also, in a sense, an internal secretion. As Cramer[9] has pointed out, this was the original conception of Claude Bernard, who believed glycogen to be produced out of protein, not denying, however, that it is capable also of being formed out of absorbed carbohydrate. And at the outset of a discussion of the significance to be attached to variations in the amount of glycogen which can be found in the organ after death, it is important to recognise that this is only a balance between processes of production and loss and may be no measure therefore of the rate at which these processes are proceeding during life; as Cramer puts it, "one should look upon the glycogen of the liver dynamically, and not, as has been done, statically as a mere store of excess of carbohydrate."

When food is withheld, the amount of glycogen in the liver rapidly becomes decreased and then increases again. In the white rat, for example, Barbour, Chaikoff, Macleod, and Orr[10] found the average percentage, in 24 hours after withdrawal of food, to be 0·16 per cent. (average of 48 rats), whereas after 48 hours it was 0·32 per cent., and these figures have, in general, been confirmed by Cori and Cori. Hershey and Orr[11] found that a steady increase occurs during later periods of starvation, although the values for individual rats were observed to be less constant than for those killed after 24 or 48 hours. The increase can be seen from the following results of an observation in which three rats were killed at each period.

	Per cent.
After 72 hours' starvation	0·21 and 0·21
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„ 120 „ „	0·42, 0·23 and 0·92
„ 144 „ „	0·78, 0·78 and 0·78

These results confirm those previously obtained by Pflüger on the dog in showing that a new formation of glycogen, or gluconeogenesis, is occurring in the liver during starvation. Protein and fat are the only known sources for this glycogen, and there are many who believe that the former is alone available, but this question does not concern us here.

Although it has been recognised for some time that starvation alone does not cause all the liver glycogen to disappear, it is usually taught that this occurs when the fasting animal is made to perform muscular exercise. But Hershey and Orr have been unable to confirm this. Again using the white rat, these workers induced muscular exercise, either by causing the animals to work until exhausted on a treadmill, or by making them swim, with short intervals of rest, in cold water, every precaution being taken to see that the time elapsing between termination of the exercise and removal of the liver was as short as possible. The preliminary fasting period was 24 hours and, in order to rule out all chances of error, a litter mate, left fasting at rest, was used as a control in each observation. The following are typical results:

	Glycogen per cent.
After 2 hours' exercise the liver contained ..	.. 0·16
And that of the control rat	.. 0·16
After 3 hours' exercise the liver contained ..	.. 0·16
And that of the control rat	.. 0·20
After 6 hours' exercise the liver contained ..	.. 0·14
And that of the control rat	.. 0·14

The liver of a rat which ran on the treadmill for 23 hours still contained 0·20 per cent. glycogen.

In none of these experiments was it possible to induce any greater reduction in liver glycogen by muscular exercise than by fasting alone. Corresponding results were obtained in the rats which were made to swim in cold water. Thus, in two rats that were in the water off and on for a period of 90 minutes, following a fast of 24 hours, the percentages of glycogen were 0·17 and 0·18.

Before concludiug that it is impossible to rid the liver of glycogen by starvation combined with muscular exercise, it was decided to repeat the observations by what is usually considered to be an infallible method for this purpose—namely, by inducing strychnine convulsions while the animal is under artificial respiration. In three rabbits, deprived of food for 48 hours and then injected with sufficient strychnine to induce convulsions for periods of 38, 44, and 57 minutes, the liver contained 0·09, 0·06, and 0·08 per cent. of glycogen respectively, and in other observations of a similar nature still larger amounts were found. These results show that the glycogen of the liver is of much greater metabolic significance than is implied in the notion that it represents a storage form of carbohydrate.

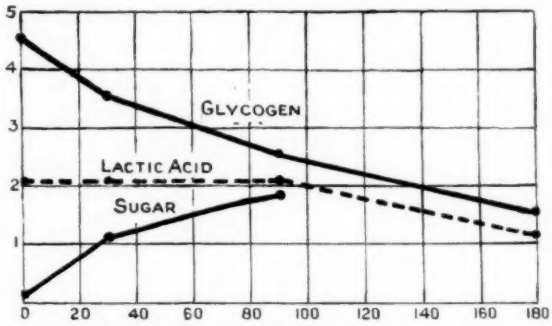
In pathological conditions, also, it is questionable whether all traces of glycogen ever disappear from the

liver; at least we have always succeeded in demonstrating its presence in the liver of completely depancreatised and fasting animals several days after they had been rendered diabetic by removal of insulin. Bordering on the pathological are those conditions established after repeated injection for a week or so of thyroid extract. Cramer and Krause[9] found that the glycogen in the liver became so far reduced, even when carbohydrate food was given during the thyroid injections, that its amount could not be estimated by the Pflüger-Bertrand method, and this has been confirmed by Kuriyama[12] and by Burn and Marks,[13] but probably some traces were present. It is important that it is only after the thyroid hormone has been repeatedly injected for some time that the glycogen almost disappears. During earlier stages no change occurs in the actual amount of glycogen in the liver, although it appears to be more readily convertible into sugar, as judged from its behaviour after injecting insulin or epinephrine. Thus, it requires very large doses of insulin to lower the blood-sugar, but only very small ones of epinephrine to raise it. These results suggest that it is not alone the percentage of glycogen in the liver that determines the readiness with which this organ may discharge sugar into the blood, but also the sensitivity of the glycogenolytic mechanism.

Of course, it would be dangerous to affirm that the liver can never be entirely cleared of glycogen, but for the present we must regard this substance as an essential intermediary in liver metabolism.

Considerable attention has in the past been given to the disappearance of glycogen from the liver which occurs immediately after death—the so-called post-mortem glycogenolysis—but it is not my intention to enter into this subject further than to allude to an interesting difference between the process in the liver and that in the muscles. The actual amount of glycogen which disappears in a unit of time under similar conditions is very much alike in both cases, but the

FIG. 1.



Showing disappearance of glycogen from the liver with increase of free sugar and decrease of lactic acid. (Lactic acid in parts per 10,000; glycogen and sugar in parts per cent.)

substances which are formed from it are different. As the glycogen disappears from the liver, free sugar increases and there is no increase in lactic acid (see Fig. 1), whereas in muscle there is no increase in free sugar but lactic acid ultimately accumulates almost in proportion to the glycogen which has disappeared (Macleod and Simpson[14]). (Compare with Fig. 3.) We will again have occasion to refer to the significance of these results.

Accumulation of Glycogen in the Liver.

Turning now to the conditions which cause glycogen to accumulate in the liver, we again find that the storage hypothesis is entirely inadequate. Perhaps the results which show this most convincingly are those obtained, first of all by Pollak[15] and later by Markowitz,[16] as a result of injecting epinephrine repeatedly into animals after the glycogen of the liver had been reduced to a minimum, through fasting and strychnine. Each injection of epinephrine was followed by hyperglycæmia, and after the injections had been repeated many times during several days, the liver was found to contain considerable amounts of glycogen. This is shown in Table I.

We shall see in the succeeding lecture that Cori and Cori have attempted to explain this result as dependent on a transfer, or shift, of glycogen from muscles to liver, but even if this were to account for the glycogen

TABLE I.—*Glycogen in Rabbits after Repeated Injections of Epinephrine.*

No.	Days(a)	Glycogen (per cent.).			Remarks.
		Liver.	Heart.	Muscle.	
7	5	0·33	0·536	0·14	Prior to injection withheld for 5 days and strychnine injected.
28	8	0·16	0·234	0·13	Ditto (4 days).
8	5	0·98	0·44	0·19	Ditto (5 „).
22	9	1·05	0·100	0·26	Ditto (5 „).

(a) Days on each of which from 3–5 c.cm. 1–1000 adrenalin injected in frequent doses.

accumulation following one injection of the hormone, it certainly could not do so for that remaining after repeated injections during several days.

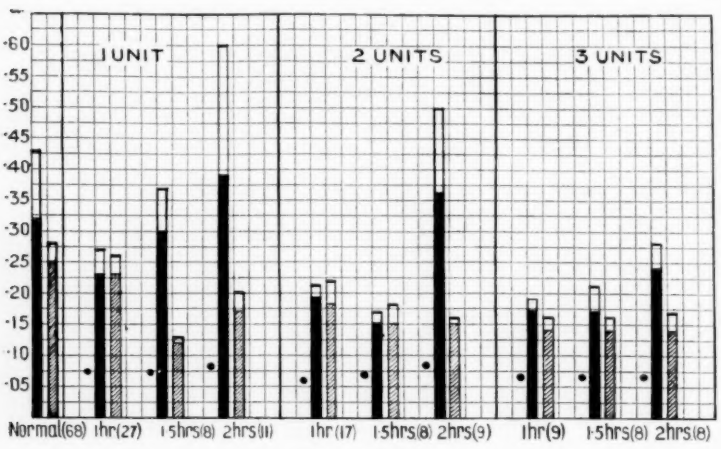
But although epinephrine stimulates the internal secretion of glycogen in fasting animals it is generally regarded to do the opposite—namely, to hasten its breakdown when given to animals with large stores of glycogen in the liver. This latter belief is mainly based on experiments by Ritzmann, but Olmsted and Coulthard[15] found it very difficult in the spinal cat to obtain corroborative evidence. It was only when the preparation was allowed to stand for some hours after decapitation, so as to get rid of all anæsthetic from the blood, that they were able, by actual measurement of glycogen in small pieces of liver, to demonstrate that a decrease in percentage occurred as the blood-sugar rose. In view of these results, this hormone must be regarded as having a reversible action, causing glycogen to be deposited in the liver when none is there and to be broken down when abundance is already present. The other hormone which most definitely has an influence on carbohydrate metabolism—namely, insulin—exhibits similar reversible effects, although the procedures necessary to demonstrate them are different in detail. Thus, when insulin is given without food to fasting white rats it first of all causes the glycogen content of the liver to become reduced, but this is followed by an increase, provided a convulsive dose has not been given. This is shown in the accompanying chart (Fig. 2) and will be referred to again when we come to consider the action of insulin. Reversible effects of insulin are also seen by comparing its action on normal and diabetic animals. When it is given along with food to normal animals, glycogen is always deposited in the liver much more slowly than after food alone, as will be shown later, whereas there is an invariable and often a marked increase in liver glycogen when insulin is injected into diabetic animals, both when food is also given and when it is withheld.

Although the observations which we have just considered, as well as those of Cramer, show quite clearly that glycogen must be produced in the liver cells out of non-carbohydrate material, by some sort of secretory process, it must not be lost sight of that it can also be deposited in them by condensation of glucose, and other hexose monosaccharides, carried to the viscus by the blood. At least, this is the simplest way by which the gradual increase in glycogen percentage can be explained when food rich in carbohydrate is fed to a previously fasted animal. In our observations of this type on white rats it was noted that the increase in glycogen was usually less marked during the first hour or so after feeding than later, the maximum, of about 4 per cent. being reached in approximately four hours. This retarded onset in glycogen deposition may possibly depend upon an unpreparedness of the liver to condense the sugar;

it cannot be due to inadequacy of a supply of blood-sugar, since this begins to mount within a few minutes of feeding the rats and, in our experiments, had reached the peak in at least one hour after feeding, and probably much earlier.

Many factors may come into play in the formation of glycogen in the liver and some of these, such as the presence of insulin and epinephrine, we will discuss more fully later. Others concern the chemical structure of the carbohydrate present in the circulating blood, but inasmuch as the observations have been mainly restricted to the liver of cold-blooded animals they do not concern us here. A decided increase in glycogen occurs in the liver in the spinal cat, especially during the first hour or so after decapitation. Olmsted and Coulthard,[17] who discovered this, could give no suggestion as to what the precursor of the glycogen might be, although the blood-sugar, meanwhile falling, was no doubt partly responsible. Recently Cori and Cori,[18] finding that *d*-lactic acid readily forms glycogen in the liver when given to rats, by feeding or injection, have attributed the result to *d*-lactic acid coming from the muscle glycogen. The only difficulty in this explanation is that the glycogen remains unchanged in the muscles of the spinal cat, according to Best, Hoet, and Marks.[19]

FIG. 2.



Influence on glycogen, in white rats, of varying amounts of insulin injected after 48 hours' fasting. Ordinates, per cent. glycogen; abscissa, times of killing after injection; black columns, liver; cross-hatched columns, muscles. Numbers in brackets give number of animals averaged in each case, and the unshaded portion of each column, the percentile error. Black dots, blood-sugar percentage.

THE GLYCOGEN OF THE MUSCLES.

Turning now to the glycogen of muscle, which has come to occupy so important a place in physiology, let us consider first of all the question of its formation. This seems to be mainly dependent on the sugar of the blood, which may be derived either from the break-down of liver glycogen or more directly from absorbed glucose. Some puzzling facts have recently been brought to light concerning the influence of the liver. After this organ has been removed in the dog the muscle glycogen steadily declines, Mann and Magath[20] finding that it was on an average 0·3 per cent. immediately after the hepatectomy, and 0·15 per cent. four hours later. Curiously enough, this diminution does not occur when the liver is practically eliminated from the circulation in the spinal cat, by ligation of the portal blood-vessels along with removal of the remaining abdominal viscera. In both groups of experiments the percentage of blood-sugar falls, but it is possible that it does so relatively less rapidly in the eviscerated preparation, on account of a leakage of sugar from the liver through the patulous hepatic veins. But even if we allow for this leakage of sugar, it is difficult to account for the constancy in the glycogen of the muscles of the eviscerated preparation since, though not visibly contracting, they are meanwhile producing heat at the rate of at least 2 calories per kg. of body-weight and per hour. If the immediate fuel for this combustion is the glycogen of the muscles, as is the present-day teaching, then we must imagine that glycogen is being built up in each muscle at a rate which is just exactly the same as that at which it is being broken down, and that its source is, in large part, the sugar which is escaping into the blood from the liver, since the total amount of sugar originally present in the blood is far from sufficient to account for the energy expended.

Best, Hoet, and Marks[19] have shown that when glucose is added to the blood of the eviscerated preparation, no glycogen is formed in the muscles unless when insulin is injected along with the sugar. On the other hand, Choi[21] has shown that when the glucose injections are made into an animal from which the abdominal viscera have not been removed, glycogen is formed in the muscles, this being dependent upon the insulin secreted by the pancreas, since no glycogen formation occurs in animals from which this organ, but not the liver, has been removed some hours preceding hepatectomy. This is shown in Table II. It is no doubt for the same reason that the fall in glycogen in the muscles of hepatectomised dogs is prevented when glucose is injected intravenously, but according to Mann and Magath[20] much more glucose must be injected to accomplish this than the 0·25 g. per kg. per hour that suffices to maintain the blood-sugar at its normal level. Although these results show that glycogen formation can occur in the muscles in the presence of insulin, this does not mean that insulin is essential for the process, since glycogen is formed in the muscles of diabetic (depancreatised) animals. Thus Chaikoff[22] found the average percentage of glycogen in the muscles of dogs on the third day of acute diabetes (caused by withdrawal of insulin from previously depancreatised animals) to be 0·425 per cent., and on the fifth day 0·350 per cent. During this interval at least 2 calories per kg. an hour were used, so that a dog of 7 kg. (about the average of the animals used) would have expended at least $2 \times 7 \times 48 = 672$ calories, representing about 160 g. of carbohydrate, in the two days, and for this, large quantities of muscle glycogen must have been formed, unless we assume that other substances than glycogen can serve as the fuel for energy production in muscle. We cannot say what factor may be responsible for glycogen formation in the muscles when there is no insulin available in the body, but it would seem most likely that it depends in some way on the liver. In other words, the material which is

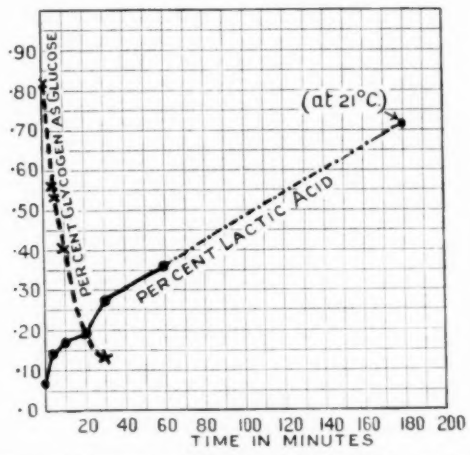
TABLE II.—*Effect of Injection of 3·5 g. Glucose on Glycogen of Muscles in Spinal Cat.*

—	Average per cent. glycogen in muscles.		No. of expts. averaged (3 muscles in each).
	Before injection.	After 2½ hours' injection of glucose.	
Eviscerated	0·685	0·689	6
Abdomen intact ..	0·516	0·570	3
Depancreatised ..	0·477	0·466	3

used for glycogen formation in the muscles when no insulin is present may be glucose that has passed through a glycogen stage in the liver or has been manufactured in this viscus, or even in the muscles themselves, by a process of gluconeogenesis.

In so far as experimental evidence goes at present, however, the only way by which glycogen can be

FIG. 3.



Decrease of glycogen and increase of lactic acid in mammalian muscle after death.

formed in the muscles of an eviscerated preparation is by injection of glucose in the presence of insulin. Fraser and I, using this preparation, have tried to find some carbohydrate derivative which would form glycogen in the muscles independently of this hormone, but without success except in one experiment in which di-hydroxyacetone was injected.

These substances have been fructose, γ-sodium lactate, di-hydroxyacetone and glycogen hydrolysed by diastase, so as to form a mixture of dextrine and sugar. Solutions of them were injected continuously into the femoral vein during periods of several hours without causing the glycogen percentage of certain selected muscles of the fore and hind legs to become increased over the percentages found present in the same muscles excised before the injections began. An unsuccessful attempt was also made in these experiments to demonstrate a possible influence of the liver, by adding to the glycogen solutions extracts prepared from this organ by faintly acidulated water.

During fasting, in the white rat the muscle glycogen steadily declines for between 24 and 48 hours, after which it remains at a constant level at least for several days. When food is given at this stage the glycogen does not, as a rule, begin to increase until after an hour or so (as illustrated in Fig. 5, Lecture II.), although absorption of glucose has been for some time sufficient to raise the blood-sugar level considerably. This latency may be dependent on inability of absorbed glucose to form muscle glycogen, either until after it has passed through a glycogen stage in the liver or until it has stimulated the pancreas to secrete sufficient insulin so as directly to affect the process of glycogen formation in the muscles. In connexion with the former possibility, it is to be remembered that glycogen formation in the liver itself does not increase much during the first hour after sugar is given to fasting animals.

The impossibility of detecting glycogen formation in mammalian muscle which has been isolated from the influence of the abdominal viscera stands out in contrast with the glycogen formation which Meyerhof and others have demonstrated to occur in isolated frog muscle under certain conditions. This result, like others, makes it probable that there are considerable differences in the chemical mechanism of amphibian, as compared with mammalian, muscle.

Breakdown of Glycogen in Muscle after Death.

Before turning our attention to the question of glycogen utilisation in the muscles, it may be well here to refer to a series of observations regarding the behaviour of glycogen in mammalian muscles after death. It is usually assumed that glycogenolysis sets in immediately, but although this is the case when the muscle has been injured, we have found that the contrary is the case for undamaged muscle. The most rapid onset of glycogenolysis occurs when the muscle is first of all frozen and then ground up into small pieces. Thus Simpson and I found,[14] when we allowed the frozen muscle powder to thaw, that practically all glycogen disappeared from it in from 20–30 minutes. Even when the temperature after thawing was not allowed to rise more than a few degrees above freezing-point, the disappearance of glycogen was very rapid, and it was also found that lactic acid did not increase nearly so quickly as the glycogen disappeared. These changes are shown in the accompanying curves (Fig. 3), which are taken from more recently performed experiments done along with Thomas. It will further be noted from these curves that lactic acid went on accumulating in the muscle suspension long after all the glycogen had disappeared. In the curve shown, the lactic acid failed to reach the amount represented by the glycogen to start with, but in other experiments it sometimes exceeded this. The irregularity of the result in this respect may indicate the operation of some as yet unknown influences on the change. The interpretation which we have put upon these results is that some substance is formed between glycogen and lactic acid, and it is possible that the presence of this in the muscle to start with accounts for the excess of lactic acid which was sometimes found after longer standing. We have been unable to demonstrate the nature of this intermediary substance. It is apparently not sugar since little increase could be detected in the reducing power of a 70 per cent. alcoholic extract of the muscle mixture by the time the glycogen had all disappeared. There was also no change in free phosphate, using the Doisy-Bell method, and we have been unsuccessful in correlating the disappearance of glycogen with breakdown of phosphagen. We suspect

TABLE III.—*Percentile Change in Glycogen at Varying Intervals after Death.*

—	Time left after death.		Change per cent. in glycogen.			Condition of muscles.
			Sartorius.	Gracilis.	Gastrocnemius.	
	hrs.	mins.				
Rabbit.	—	40	−4·2	No change.	+10 h.c.	Soft, pink, irritable.
	2	—	−54	−16	+2 h.c.	Greyish, irritable.
	4	10	−84	−79	−63	Opaque, very slightly irritable.
Cat	2	30	−34	−14	−2·5	Irritable.

h.c. = higher than control.

that this intermediary substance may be some carbohydrate, perhaps a trisaccharide, which is destroyed by 30 per cent. KOH and is insoluble in 70 per cent. alcohol. I have already alluded to the different results obtained with liver under similar conditions.

As these researches were in progress, Orr and his associates noted that there was very little, if any, difference in the percentage of glycogen in the muscles removed from rats that had been dead an hour or so, as compared with that in muscles removed immediately after killing. This observation led to a special study by Miss Mackay[23] of the behaviour of glycogen in intact muscle, in which she compared the percentages in certain muscles removed under ether anæsthesia from one limb (in rabbits) with those of the corresponding muscles from the opposite limb removed at varying

periods after death. The results are summarised in Table III. in which the changes in glycogen at the periods indicated after death are expressed as a percentage of the amounts present in the corresponding muscles immediately before death.

It can be seen that post-mortem glycogenolysis in intact muscle is very slow compared with that occurring in pulverised muscle, that its rate varies considerably in different muscles, and that the glycogen, instead of decreasing, may actually increase in amount. Incidentally, it was observed by Miss Mackay that the irritability of the muscles towards electrical stimulation persisted longer in those which had been dissected free from the surrounding tissues and kept moistened with gauze soaked in Ringer's solution than in muscles left in situ without any dissection. The onset of rigor was also delayed in the dissected muscles. The most noteworthy result was, however, the apparent increase in glycogen observed especially in the gastrocnemius muscles. Since this was not very marked, however, it might signify nothing more than a relative increase due to blood having drained out of the muscle after death. In more recent experiments which Fraser and I have performed, this possibility has been ruled out, since we did not remove the muscles from the left leg until immediately after death.

Rabbits killed either by chloroform or by stunning were used. Certain muscles were then dissected from the left leg, and after leaving the carcass for an hour at room-temperature, the corresponding muscles of the right leg were removed. Table IV. shows some of the results, and in this case these are given in actual percentages, as well as in percentile changes.

TABLE IV.

No.	Muscle.*	Glycogen. Per cent.		Per-centile change + or —	Lactic acid. Per cent.	
		Left.	Right.		Left.	Right.
31	T.a.	0·69	0·83	+ 20	0·21	0·27
	G.	0·61	0·65	+ 7	0·1	0·33
33	T.a.	0·55	0·44	— 20	0·05	0·07
	G.	0·54	0·52	— 4	0·04	0·07
35	T.a.	0·31	0·44	+ 40	0·05	0·22
	G.	0·34	0·41	+ 22	0·07	0·19
38	T.a.	0·60	0·75	+ 25	0·07	0·11
	G.	0·70	0·89	+ 27	0·10	0·18
39	T.a.	0·28	0·29	+ 5	0·08	0·12
	G.	0·24	0·20	— 23	0·09	0·12
40	T.a.	0·31	0·65	+110	0·07	0·09
	G.	0·42	0·29	— 32	0·06	0·11

* The animals were killed by chloroform, but similar results were also obtained in those killed by stunning.

T.a. = tibialis anticus; G. = gastrocnemius.

The usual variability, both in the glycogen content of corresponding muscles in different animals and in that of different muscles in the same animal, is seen, but in only one animal was the percentage less in one hour after death in both of the muscles examined. It is possible that corresponding muscles of the two sides did not contain the same percentages of glycogen at the time of death, and this will require further investigation. In the light of observations on other animals than the rabbit it has been assumed that the percentages are alike. We also determined the percentage of lactic acid, using for this purpose the modified permanganate oxidation method after removal of sugar from an alcoholic extract of the muscle, by means of copper sulphate and milk of lime. An increase is evident in all cases, but no relationship can be detected between either the glycogen percentage to start with or the extent of the post-mortem increase in glycogen and the increase in lactic acid.

These results, which it may be stated are not dependent upon any changes in the water content of the muscles, suggest the presence of some hitherto unknown precursor from which both glycogen and lactic acid are derived. This must either break down first of all into glycogen, lactic acid being formed at an independent rate out of the general store of glycogen, or it must be a substance from which both glycogen and lactic acid are formed. In the former case, the substance would be a larger molecule than glycogen, whereas in the latter, it would be a smaller one and might be a lower dextrine or some poly-saccharide, perhaps a tri-saccharide. We have so far been unsuccessful in demonstrating any change in the free sugar of the muscle extractable by alcohol, but this may be because we used strong alcohol in preparing the extracts.

I have already referred to experiments by Simpson, Thomas, and myself in which it was shown that glycogen disappears from pulverised frozen mammalian muscle after thawing much more rapidly than lactic acid accumulates, and from which it was concluded that between the two some intermediary substance, possibly a tri-saccharide, must be formed. It is just possible that we are dealing with the same substance in both groups of experiments, but if this be the case then we must suppose that the agency for its conversion into glycogen becomes destroyed by freezing and pulverising the muscle. May it be because of destruction of the architecture of the muscle-fibre by the fine ice crystals which form in it when it is suddenly frozen, that the power of glycogen synthesis disappears?

Breakdown of Glycogen in Muscle during Life.

With regard to the breakdown of glycogen in mammalian muscle during life, very little is definitely known, at least for muscle which is under perfectly physiological conditions. That the percentage of glycogen remains unchanged for at least an hour after the blood pressure has been reduced to zero makes one wonder whether its failure to rise in the muscles of an eviscerated preparation, even when excess of glucose is present in the blood, may not indicate that a part of the glycogen-forming powers have disappeared, although they can be stimualted in the presence of an excess of both insulin and sugar.

It has been known for long that the glycogen becomes reduced when the muscles contract, and, of the older experiments, I need only recall here those of Manché[24] and Chandelon,[25] who compared its amount in the muscles of one leg, paralysed by cutting the nerve-supply, with those of the opposite leg in which there had been more or less activity. An experiment of this type more recently performed is that of Best, Hoet, and Marks,[18] who, by injecting convulsive doses of insulin into cats in which the sciatic nerve of one leg had been severed, found that the glycogen content of the paralysed muscles remained high, while it became very low in those undergoing contractions. Incidentally, it may be remarked, these results also show that the glycogen of one set of resting muscles cannot be drafted, by way of the circulation, to provide glycogen for an active set, even although the demands of the latter may be urgent. In the light of these results and also those obtained on isolated frog muscle, it is to be expected that glycogen will decrease when mammalian muscle is stimulated. Some results obtained by Miss Mackay will illustrate this.

In the decapitate cat three muscles were dissected from the left leg, and the corresponding ones of the right leg were then stimulated electrically, either through the nerve or directly. The extent of reduction in glycogen, calculated as a percentage of the amount originally present in the resting muscles, is shown in Table V.

Even a few moments of activity is seen to be associated with a decided reduction in muscle glycogen, and this becomes more marked as activity is maintained.

In these experiments the liver was still intact and it contained a rich supply of glycogen, owing to previous feeding of the animals with sugar. Had the liver been absent it is probable that the glycogen would have become more rapidly reduced by activity, and it was the original intention of the research to study this possible influence of the liver. With this in view Miss Mackay performed several experiments in which the muscles in animals with the liver intact and containing much glycogen were left at rest for an

hour or so after stimulating them, but the extent to which the glycogen reappeared, as judged by comparison with the results shown in Table V., was very limited, if any really occurred. I have formed the impression, both from these experiments and from those more recently performed by Fraser and myself, that the failure to demonstrate decided glycogen formation in the muscles of the spinal preparation unless when insulin is present in excess is due to the low blood pressure.

TABLE V.—*Percentile Fall in Glycogen in Stimulated Muscle with its Blood-supply Intact.*

Time of stimulation.	Method of stimulation.	Fall in glycogen (in per cent. of amount found in control muscle).		
		Sartorius.	Gracilis.	Gastrocnemius.
St.*	Directly on muscles.	100	81	94
30–40 mins.	,,	81	62	75
5 mins.	,,	43	36	35
2 ,,	Through foot and thigh.	38	—	25
1 min.	Directly on muscle.	43	—	—
1 ,,	Through foot and thigh.	20	—	—

* St. = Stimulated till muscle would contract no longer.

Finally, something must be said concerning the behaviour of the muscle glycogen in white rats after varying degrees of exercise, either on a treadmill or by swimming in cold water. I have already alluded to the behaviour of the liver glycogen in these experiments. Table VI. shows the results for the muscles.

TABLE VI.—*Glycogen (average per cent.) in Muscles of Fasting White Rats after Exercise (with Controls). Fasting Periods 24 Hours.*

Duration of exercise.	Exercised rats.	Control rats.	No. used.	Duration of exercise.	Exercised rats.	Control rats.	No. used.
1 hr.	0·26	0·28	2 and 4	3 hrs.	0·26	—	1*
,,	0·24	0·30	3 and 3	6 ,,	0·27	0·27	1 and 1*
,,	0·27	0·37	3 and 3	7 ,,	0·20	0·24	1 and 1
,,	0·28	—	6	23 ,,	0·10	0·18	1 and 1
2 hrs.	0·26	0·27	1 and 1	Sw.	0·07	—	1
2½ ,,	0·11	0·28	1 and 1	1½ hrs.	0·05	—	1
3 ,,	0·24	0·37	1 and 1				

Sw. = Swimming. * Rat lost 4 g.

It is seen that even prolonged exercise in the rat does not depress the muscle glycogen very much, a result which stands out in contrast with that obtained by artificial stimulation of the muscles of a spinal preparation. With the exception of those that were made to swim in cold water off and on for 1½ hours, the rats may be said to have been in a "steady state" of activity without having been markedly exhausted at the end of it. Nevertheless, running on a treadmill for several hours is strenuous enough work for a rat. The results show that in the steady state of muscular activity, not only are the oxygen requirements of the acting muscles continuously provided for but those of glycogen as well. Glucose derived from the glycogen of the liver no doubt furnishes the raw material for the reconstruction of much of this glycogen in the muscles, but it is possible that some is also manufactured in the muscles themselves out of protein and fat. I can see no way for putting this possibility to the test of experiment, but it is significant that the percentage of blood-sugar, even after the longest periods of exercise, was practically the same in the exercised rats as in the controls. It was certainly not lower. Taking the results of both groups of experiments together, it would appear that it is only when muscular activity is so strenuous that the oxygen-supply cannot keep pace with the demands that the glycogen is significantly lowered. This would presumably be the case in muscles of the spinal cat when they are artificially stimulated and also in those of intact animals injected with strychnine or with large doses of insulin. In seven rabbits given convulsive doses of strychnine, Hershey and Orr found that the muscle glycogen averaged 0·064 per cent., the lowest value obtained after convulsions had lasted for 57 minutes being 0·03 per cent. It is worthy of note that some glycogen was always found present.

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RADIUM TREATMENT BY THE IMPLANTATION OF SCREENED SEEDS.

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NEW YORK CITY.

IT is now some two years since radium treatment by the method of implanting screened seeds containing radon was introduced into England. The rapidity with which this technique has made a place for itself among the longer established method of applying radium is attested by the number of papers in this and other journals in which cases so treated are described in considerable detail. In the Medical Research Council's report on the work done in certain hospitals during the year 1927 we find but one reference to the implantation of platinum radon seeds, but in Gask's Hunterian Lecture, delivered in January of last year, the method is described at length, as it is also in earlier publications of this speaker and a number of others, notably Gosse and Chester-Williams, and Stanford Cade. The general plan of treatment and its results in a rather limited field are thus fairly familiar to readers of THE LANCET. It has, however, a far wider range of usefulness, and it has seemed possible that some suggestions along this line from its originator might be of general interest to the British medical profession.

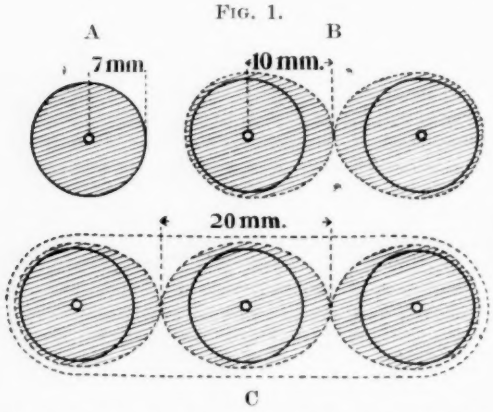
Advantages of the Screened Seed.

The advantage of the implantation method as compared with surface applications are too well known to need any amplification here. Those which the seed screened with platinum possesses over the unscreened or "bare tube" and the gold container of radon are perhaps less generally comprehended. The bare tube offers no obstacle to the passage of caustic

beta radiation. Therefore a zone of necrosis invariably forms about each implanted seed. By using very minute quantities of radon in each seed the amount of this necrosis can be greatly reduced, but it can never be entirely eliminated. Moreover, when the amount of beta radiation is limited, an equal limitation is placed upon the therapeutic gamma radiation available from the same source, so that effective dosage is proportionately reduced. To offset this, a great number of these small containers must be used in a given neoplasm in order to ensure adequate dosage.

The gold seed as produced in the United States for the past three years substitutes gold for glass, the radon being gathered and placed in a long capillary tube of either material, this long tube being thereafter subdivided into seed lengths. The glass seeds are sealed off with a flame; the gold seeds are pinched with an ordinary pair of pliers, the cutting edges of

FIG. 1.



The diagram (A) shows a cross-section of a platinum radon seed embedded in tissue, the cross-hatching representing the "zone of potential tissue change" about the seed; this zone is represented by a circle with a radius of 7 mm.

The diagram (B) illustrates the implantation of two seeds; cross-firing increases the zone of potential tissue change, so that the "limiting isodose line" must now be represented by the dotted line at the periphery of the cross-hatched area. The seeds are implanted 2 cm. apart to avoid overlapping of the zones of potential tissue change.

At the bottom (C) are three seeds implanted 2 cm. distant from one another. The zone of potential tissue change about each seed is represented by a cross-hatched area, showing how the effect of the centre seed is now increased by 3 mm. on each side. In actual practice it has been found that the radiation extends somewhat beyond the limiting isodose line represented by the dotted line enclosing all three schematic representations of the seeds and their surrounding zones of potential tissue change.

which have been purposely dulled. Though this usually makes a gas-tight seal, if there are any imperfections in the gold tubing leakage is likely. The violent reactions which have been reported in some cases where the gold seed has been used were probably due to this cause. The gold seeds are estimated by their designer as being twice the size of the bare tubes, but by virtue of their wall thickness of 0·3 mm. filtering out all but 8·8 per cent. of the beta radiation. As they contain twice the amount of radon that is used in glass seeds they are capable of transmitting twice the amount of gamma radiation possible by the older method. The greatest drawback they possess—aside from the dangers of leakage already mentioned—is the "chisel-like" ends left on each seed by the method of separation with pliers. Not only are these sharp ends likely to induce unnecessary trauma as they are introduced, as there is no way in which they can be recovered, they must remain as an irritative foreign body in the tissues they were used to treat, a circumstance which makes it quite impossible to use them under many conditions.

The fact that the platinum radon seed consists of a perfectly tight glass tube encased in platinum 0·3 mm. or 0·4 mm. thick, does make it, as was recently stressed by Duffy, somewhat larger than the gold seed. This disadvantage is, however, so trifling as in itself to be negligible, and when it is offset by the absolute certainty that leakage will not occur; that no trauma can be induced by its perfectly rounded ends; and that it can be removed as soon as treatment is concluded, its pre-eminence is readily recognised. Should any occasion arise wherein it is deemed undesirable to remove the seeds, the thread attached to each one can be easily omitted, though in practice this is seldom necessary. Even without its thread the platinum-screened seed is superior to the gold because of insurance against leakage and absence of irritation from the rough ends.

Application of the Platinum Radon Seed to Malignancies of the Mouth and Throat.

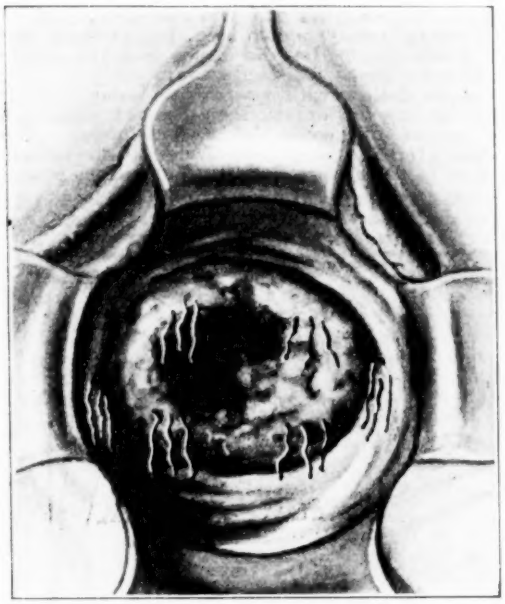
As most of the publications in England have referred only to the use of the platinum seed in treating intra-oral lesions it will be of greater interest to discuss at length some other applications of this form of therapy. Therefore it will be necessary only to touch briefly upon its use in the mouth and throat. In a publication made three years ago in the *Annals of Surgery* I called attention to the peculiar adaptability of the removable platinum seed to malignant lesions of the tongue. Especially is this true when the lesion is situated far back upon the dorsum of the tongue, where needles cannot be kept in place and no foreign body should be permitted to remain indefinitely in the tissues because of the extreme mobility of the parts. In any area of the mouth elimination of necrosis is essential because of the great vascularity of the tissues, so the assurance that no leakage of radon from the tube can occur is most desirable. Lesions at the root of the tongue and on the floor of the mouth, as well as those found in the tonsil or larynx, can be successfully implanted from the outside, thus doing away with any possibility of infection of the attached threads by the mouth secretions. This is, in practice, a purely hypothetical objection, but as it can reasonably be brought forward, it is desirable to provide against any such possibility.

In the œsophagus the dangers from tissue necrosis are perhaps greater than in any other area wherein radium therapy has been tried. Sloughing there means a fistula into lung or trachea, with rapidly fatal results. There is no doubt that a number of patients have met inevitable death sooner because of radium having been used by a method where necrosis could occur. By using the platinum-screened seed this danger is definitely eliminated, and even in cases where complete stricture had already taken place the lumen of the œsophagus has been restored to patency, and the patient so far relieved that he could return to a gainful employment, resuming his ordinary diet and habits.

Implantation as an Adjunct in Gynæcology and Urology.

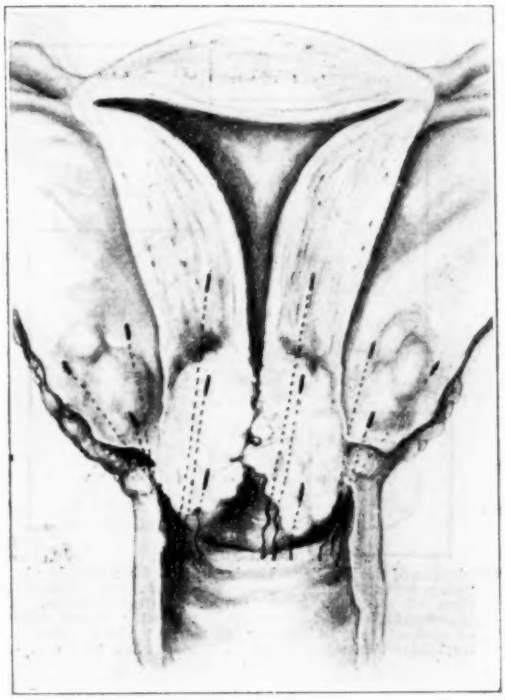
The treatment of early and moderately advanced cancer of the uterine cervix by radium has now been so standardised as to rank with surgery as an efficient method of treatment, being regarded as the method of choice in many clinics. In such a cavity as the uterus, however, the implantation method has, apparently, no place. Yet during the past three years this particular form of radium therapy has found an ever-increasing usefulness in cases showing involvement of broad ligaments and vagina, in which all methods—of surgery and radium alike—have heretofore proved impotent. When the cervical canal is completely blocked by malignant exuberations, or the cervix has become a sloughing mass, insertion of the usual uterine applicators becomes impossible. The woman who presented such a condition was once doomed to die unaided by anything more than palliation. Yet it is now possible for a skilful operator

FIG. 2.



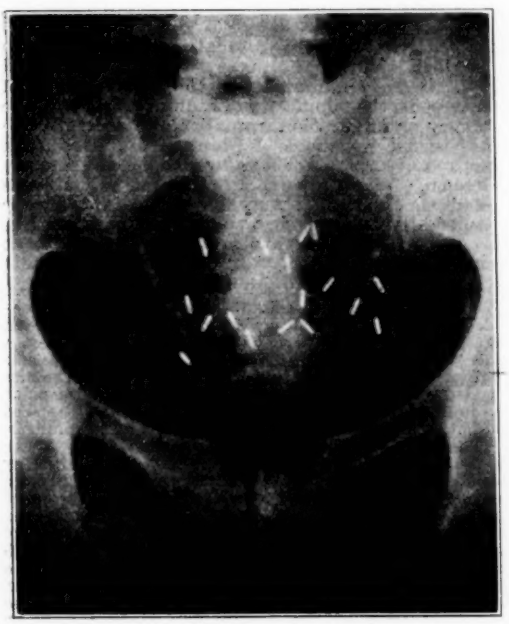
Advanced carcinoma of the uterine cervix. Removable platinum seeds have been implanted in the infiltrated tissues of the malignant cervix.

FIG. 3.



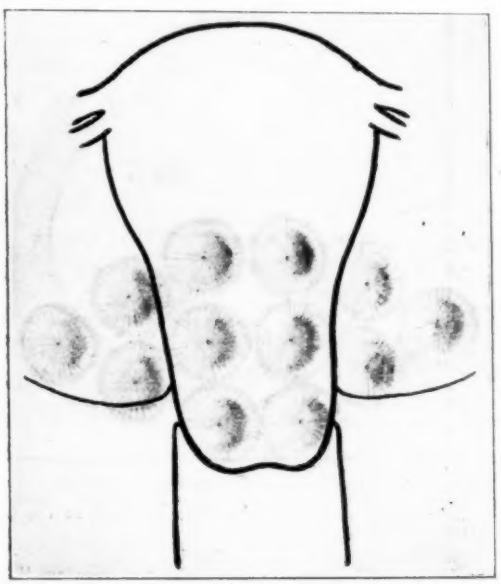
Advanced carcinoma of the uterine cervix. Cross-section (semi-schematic) showing the position of the implanted seeds in relation to the seed-threads.

FIG. 4.



Advanced carcinoma of the uterine cervix. Radiogram showing platinum seeds in position, immediately after implantation.

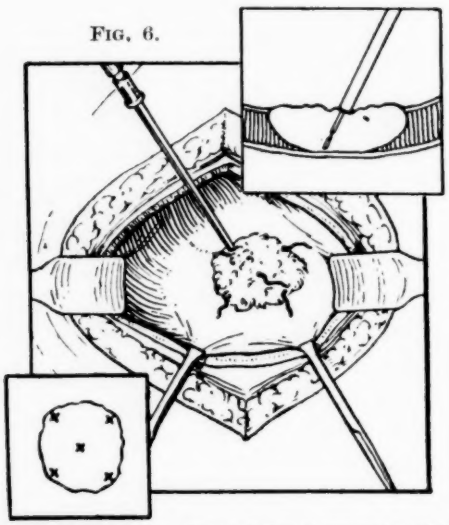
FIG. 5.



Advanced carcinoma of the uterine cervix. Schematic view showing zones of tissue irradiated by each seed.

to implant even the highly friable tissues infiltrated by advanced carcinoma, and to remove the seeds after a suitable exposure, without inflicting any further trauma upon the carcinomatous area. The effect

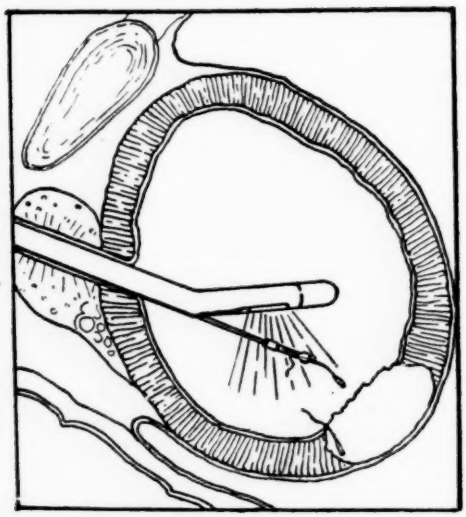
FIG. 6.



Carcinoma of the bladder. Implantation of removable platinum radon seeds through suprapubic cystotomy. Note distribution of seeds as shown by protruding threads. Insert shows relative position of seeds (at left); actual deposition of seed at base of tumour (at right). The shoulder of the implanter limits the depth of implantation to 1 cm.

of such treatment has proved astonishing. The intolerable pain rapidly subsides, foul-smelling discharge is lessened or ceases altogether, elimination of the toxic focus polluting the blood stream permits a marked improvement in the patient's general

FIG. 7.



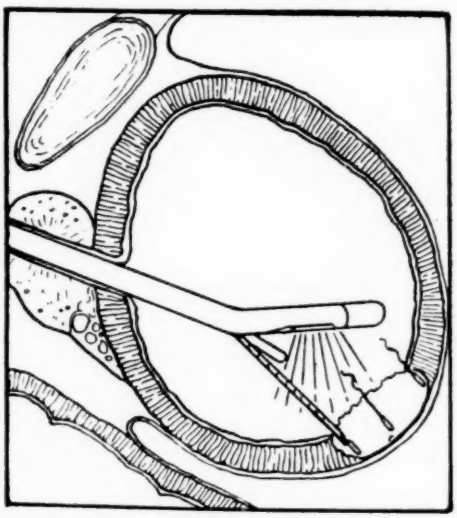
Implantation of removable platinum seeds through the cystoscope using flexible cystoscopic implanter. Protruding threads serve as a guide to the operator in the proper distribution of the seeds.

condition. The malignant area "cleans up" in a short time to such an extent that it will be possible to make use of the regular means of applying radium, as is done in the cases seen when only moderately advanced. So much benefit has accrued to this hitherto hopeless class of patients that even if we regard it merely as a form of palliation, the results amply justify the employment of the method.

In lesions lower down in the general tract, carcinoma of the vagina and vulva, implantation may be employed by the same general technique which has been indicated for similar types of lesion elsewhere. Cancer of the vulva is very seldom seen, but in those few cases where the method has been used the results have been eminently satisfactory.

It is in dealing with vesical neoplasms in both sexes that the implantation of screened seeds has found one of its greatest fields of usefulness. The bare tubes formerly used showed, despite the serious objection of necrosis production, that radium was a

FIG. 8.



Illustrating method of removing seeds through the cystoscope after adequate dosage has been delivered. This may be done with the ordinary cystoscopic forceps.

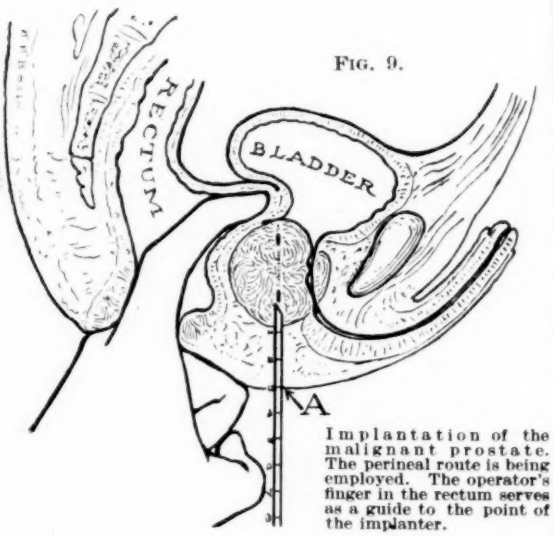
very effective agent in combating malignancy in the bladder. When the dangers of necrosis and sloughing were eliminated by the introduction of proper screens, the popularity of radium as a substitute for surgery or fulguration rapidly increased. In the recently issued text-book of Eisendrath and Rolnick the method of implantation is dwelt upon at considerable length. When removable platinum radon seeds are used the operation may be carried out either cystoscopically or through a suprapubic incision, but its usefulness in connexion with cystoscopic work especially commends it.

"One employs a seed filtered by 0·3 mm. of platinum, capable of delivering a dosage of 333-1/3 millicurie hours—that is, 2·5 millicuries of radium emanation destroyed in ten day's time. These seeds are placed in the neoplasm at a distance of 2 cm. apart. The Muir implanter is passed through the channel of an operating cystoscope. The site for the deposit of the first seed having been selected, the point of the implanter is thrust into the neoplasm and the seed placed in the loading slot. This seed, pushed by the plunger, is carried into the tissues to a predetermined depth. When it reaches this depth, its progress is automatically halted by the shoulder of the instrument which prevents the point from advancing beyond a certain distance. When the instrument is withdrawn, the seed remains in place, the thread attached to it being plainly visible protruding from the point of entrance. The first seed deposited thus serves as a landmark, from which the proper location of all subsequently to be implanted can be readily ascertained. The total number, of course, depends upon the size of the growth and the estimated invasion of the surrounding bladder wall by possible malignancy. . . . When the period of exposure to radiation has expired—this is ordinarily nine or ten days—the seeds are withdrawn through the cystoscope, using either an ordinary forceps or an instrument specially designed to

meet this need. The threads attached to the seeds must be cut off to a length not exceeding one centimetre before being placed in the loading slot, for if too long they may become entangled in the cystoscope as that instrument is withdrawn, and the seeds thus displaced or even dislodged entirely. With the exercise of a little care and deliberation, however, such accidents can be readily avoided."

In treating malignancy of the prostate it is customary to permit the seeds to remain permanently in the tissues, which causes no foreign body reaction nor irritation when the smoothly rounded platinum seeds are used. The implantation is generally done under novocaine infiltration; occasionally, when indicated, the sacral method is used successfully. Implantation is done preferably through the perineum, but where a suprapubic opening already exists it may be utilised for open insertion. A few operators make a suprapubic exposure especially to facilitate the implantation. The operator keeps his left index-finger in the rectum to guide the needle point of the implanter; when he feels the resistance of the tissues to the advance of the needle he will realise that the point has penetrated to depth sufficient to permit the seed to be deposited. The deepest seed must be deposited first, otherwise implantation may begin on either side. Four seeds are customarily employed, being deposited at the apices of the prostatic lobes in such a way as to bear the relation one to another such as is borne by the

FIG. 9.



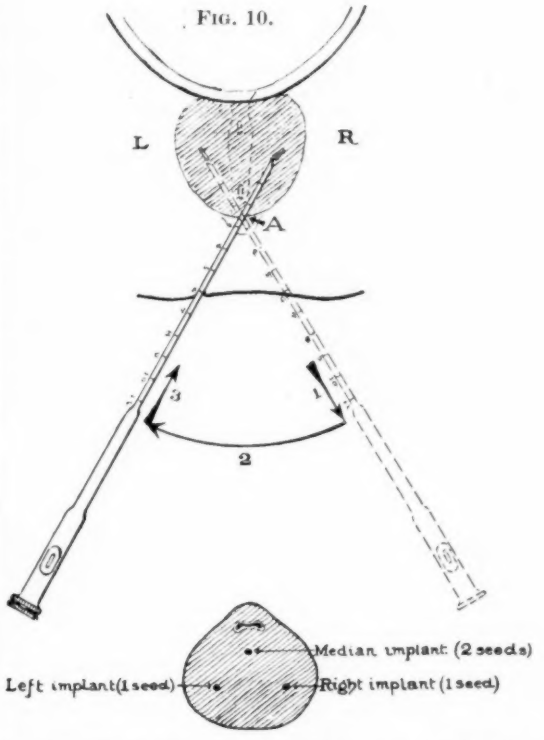
Implantation of the malignant prostate. The perineal route is being employed. The operator's finger in the rectum serves as a guide to the point of the implanter.

apices of a right-angle pyramid. But one portal of entry is necessary. The angle of the handle of the implanter can be altered without entirely withdrawing the instrument. The point can be withdrawn and the angle changed so that each seed will be deposited not less than 2 cm. from the others. The arrangement of the seeds can be clearly seen in the accompanying diagram (Fig. 10).

Suprapubic insertion does not differ especially from the transperineal technique, though the work is naturally much simplified by the free exposure of the site of malignancy. The seeds generally used in either case contain 2·5 millicuries of radon, which when left permanently in situ provides 333-1/3 millicurie hours of gamma radiation. This method of treating malignancy of the prostate will be found vastly superior to needles which have proved so traumatising that they have been largely abandoned in American clinics where much prostatic work is carried on. Lowsley and Kirwin in their text-book call attention to the possibility of permitting these prostatic patients to leave the hospital much sooner than under any other conditions of treatment. "This possibility of escaping the prolonged hospital stay will often induce him to undertake the radium treatment when other forms of therapy would be refused."

The simplicity and accuracy which are among the most salient features of this technique have greatly extended the field of usefulness within the bounds of

FIG. 10.



Implantation of the malignant prostate. The method of altering the angle of the implanter, so as to place the seeds at the different angles desired, is here shown. Insert gives schematic representation of the prostate after implantation is completed.

which radium has in the past been so closely restricted. It should serve to bring about rapid fulfilment of the prophesy made a few months ago by Mr. Hayward Pinch that, "in the very near future radium would form as much a part of the up-to-date surgeon's armamentarium as the scalpel," and it might be added—will prove itself as generally useful.

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THE CHOLESTEROL OF THE BLOOD PLASMA IN EPILEPSY.

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THERE have been many attempts to find some chemical change in the blood related to epileptic seizures, though until recently they have met with but little success. Lately, however, several observers have reported alterations in the blood cholesterol in epileptics. De Crinis [3] in 1920 stated that the blood cholesterol was increased before an attack. Pezzali [6] in 1923 found uniformly low levels of the blood cholesterol in epileptics, especially during seizures. Popéa and Vicol,[7] noting that the lipoid was almost absent from the suprarenals after death in status epilepticus, found a decrease in the blood cholesterol during and after the attacks. They concluded that the fall was due to the consumption of the circulating cholesterol during the fits. Robinson, Brain, and Kay [8] found that the average blood cholesterol level in a group of epileptics was lower than in a corresponding group of controls, and that the average level was lower in blood taken within 24 hours of a fit than in blood taken after a longer interval. They found that the fall in the blood cholesterol preceded the attack in 10 out of 11 cases in which serial estimations were made. Osnato and Killian,[5] and Goodall [4] have also investigated the blood cholesterol in epilepsy but with negative results. Their deductions, however, are open to criticism and we shall discuss them later.

The present paper is an account of serial estimations of the cholesterol content of the blood plasma in 21 epileptics and five controls, comprising two normals and three patients suffering from diseases of the nervous system other than epilepsy.

Method.

The method employed was that of Bloor,[1] the only modification being that 1 c.cm. of plasma was used in 25 c.cm. of the alcohol and ether mixture. It has been found that this method will only give satisfactory results if the instructions in the original paper are strictly adhered to. In this series of estimations there has been little difficulty in matching the green colour produced, but it has been found that the following conditions are important. All glassware used in the final extraction with chloroform must be absolutely freed from moisture, preferably by drying in hot air; if this is not done a yellow tinge in the final green colour makes it difficult to match with the standard, and also gives too low a result. The acid used to develop the colour must be fresh and the amount (0·1 c.cm.) very accurately measured; the slightest excess gives a blue tinge in the green. The colour develops best within Bloor's limits of temperature—viz., 20–22°C.—and readings should be made 12 to 15 minutes later. It has been noticed that the colour does not develop fully in less than ten minutes and may begin to fade if left much over 15 minutes; consequently not more than six or seven estimations can be made with the same standard. With every precaution we have found that the method gives a difference of about 3 per cent. in different estimations of the same samples of plasma—e.g., in three separate such estimations on the same sample the results were as follows:—

1. 0·203
2. 0·202
3. 0·208

} Per cent. of cholesterol in 100 c.cm. plasma.

Therefore in the following series variations of less than 10 mg. between successive estimations may be due to experimental error. The estimations have been done on oxalated blood plasma, obtained by venepuncture. Estimations on whole blood have not been included, as experience showed that after extracting this with the boiling alcohol and ether mixture the extract had, in some cases, a brownish tinge which interfered with the final colour. This did not occur with blood plasma.

It will be appreciated that the necessity for repeated venepunctures made it difficult to secure a large series of estimations, especially in children. Moreover, venepuncture was usually impossible when status epilepticus was actually in progress. Most of the observations have been made during the night with the patients at rest in bed, several hours after the last meal. This has been done partly because the fit incidence is higher at night and partly to eliminate the effect of meals and of possible changes due to muscular exercise, although, as a matter of fact, in curves obtained during the day meals alone did not affect the level (see Series 12 and 13 in Appendix I.). The epileptics investigated were all patients living an active outdoor life at the Colony, Lingfield, and were clinically healthy except for fits; patients with conditions known to be associated with a low blood cholesterol—e.g., anæmia or infective conditions—were not included, and all the cases, with two exceptions (Nos. 12 and 29), apparently belong to the "idiopathic" group.

We regret that owing to one of us leaving England, it was not possible for us to include as many determinations of the plasma cholesterol in controls as we should have liked. We felt that it was better to publish our investigations as they stood, rather than that the determinations in normals and epileptics should be made by different persons. The lack of controls, of course, does not affect the validity of conclusions based upon differences in the plasma cholesterol in different groups of epileptics, and the normal blood cholesterol as determined by the method we employed is well established.

Average Plasma Cholesterol Level in Epileptics.

The first point to which we shall direct our attention is whether or not our investigation confirms the findings of Robinson, Brain, and Kay that the average blood cholesterol level is lower in epileptics than in normals, and lower at a time near the convulsion than in intervals of freedom from attacks.

The normal level of blood cholesterol varies within fairly well-defined limits. Campbell [2] gives the normal figures for free and ester cholesterol as from 0·150 to 0·230 per cent. Robinson et al, using Sackett's [9] modification of Bloor's method, gives the following values for plasma:—

	Max.	Min.	Mean.
39 males	0·212	0·142	0·163
32 females	0·217	0·133	0·172

Sackett obtained results varying from 0·115 to 0·280.

As our investigation was not primarily directed to determine average levels we have not performed a number of determinations upon normals. Two healthy persons, however, upon whom serial determinations were made yielded means of 0·241 and 0·207 per cent.; and we have also employed as controls three patients suffering from diseases of the nervous system other than epilepsy.

The following table embodies our results so far as they throw light upon the average plasma cholesterol level in epilepsy:—

Present investigation.					Robinson, Brain, and Kay.
Class of patient.	Patients.	Series.	Readings.	Average (plasma cholesterol).	
Controls	5	5	32	187	167
Epileptics: Blood removed more than 24 hours before or after a fit	7	10	59	142	155
Epileptics: Blood removed within 24 hours of a fit, excluding cases of status..	15	17	111	137	135
Epileptics: In status or serial epilepsy	4	5	26	100	—

These figures appear to us to justify two conclusions:—

1. The average blood cholesterol in this group of 19 epileptics is below normal.

2. Status epilepticus and serial epilepsy are associated with especially marked depression of the blood cholesterol. The extremely low figure of 0·036 per cent. was obtained in one of our patients at the end of a severe attack of status. The numbers are insufficient to justify any conclusion being drawn as to the relative level of the blood cholesterol at times near and remote from the attack.

Osnato and Killian [5] have criticised the findings of Robinson, Brain, and Kay and drawn contrary conclusions on grounds which appear to us entirely inadequate. They report a single determination of the blood cholesterol in 22 epileptics, in four of whom the blood was obtained within 24 hours of a fit. Such small numbers in our opinion justify no conclusion whatever as to the behaviour of the blood cholesterol in relation to the fits. Osnato and Killian criticise Robinson, Brain, and Kay on the ground that the blood cholesterol varies in normals during the day more than the difference between normals and epileptics. Such criticism is misdirected, and appears to be based upon a misunderstanding of the nature of averages. In the series of Robinson, Brain, and Kay there are 124 epileptics and 71 controls. Any normal variation ought on Osnato's hypothesis to be common to both groups and cancel out. It is unthinkable that, as he seems to imply, 124 epileptics should all have been examined by chance at the lower part of their normal range, and the controls all by chance at the upper part. The same fallacy underlies Osnato's stress upon anæmia or fever as possible causes of the differences between normals and epileptics, since the controls were taken from the same hospital population as the epileptics. Osnato and Killian, moreover, performed no serial blood cholesterol determinations in epileptics, and misquote the number performed by Robinson, Brain, and Kay as 2 instead of 11.

Goodall [4] has recently published the results of an investigation of the blood cholesterol level in six epileptics, three determinations being made in the interparoxysmal and three in the preparoxysmal period. He states that "the mean value for the blood cholesterol in the preparoxysmal phases is not markedly different from that in the interparoxysmal phases. The variations from the mean tend to be greater in the former," and "the preparoxysmal cholesterol usually tends to be slightly lower than the interparoxysmal value." Goodall's findings, as far as they go, appear to support the conclusions of Robinson, Brain, and Kay, but we feel that it would not be justifiable to lay much stress upon them. Since the blood cholesterol in epilepsy may vary greatly from hour to hour especially in the proximity of a fit, it is doubtful if much information can be gained from so small a number of determinations. Either the serial method or the averaging of determinations in large groups would seem to be essential.

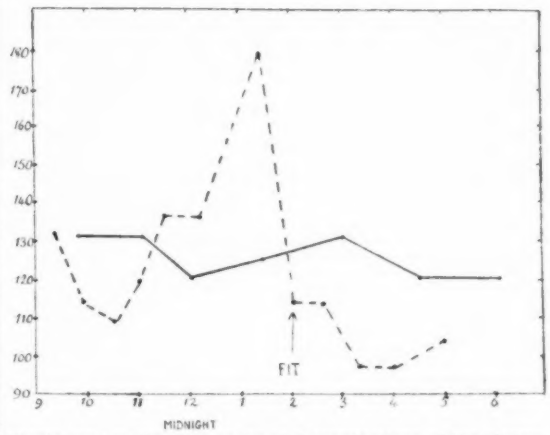
Variability of Cholesterol Level in Epileptics.

Our special object in this investigation was to study the behaviour of the plasma cholesterol level in epileptics by means of serial determinations, to observe whether abnormal variations in the level occurred, and, if so, whether these were in any way related to the occurrence of fits.

It is first necessary to form an opinion as to the normal limits of variation of the blood cholesterol. The simplest mode of expressing the variability as determined over a given series of determinations is to take the average level of the series and the range—i.e., the difference between the highest and lowest value in the series—and to express the range as a percentage of the average. For example, if the average of seven serial determinations were 150 mg. per 100 c.cm., the highest value obtained being 200 and the lowest 125, then the range is 75, and $\frac{\text{range}}{\text{average}} = \frac{75}{150} = 50$ per cent.

There are comparatively few data upon which to base an opinion as to the normal variability of the blood cholesterol. We have made two series of determinations on healthy adults, yielding variabilities of 5 per cent. in each case; and three series of determinations on patients suffering from organic disease of the nervous system not associated with convulsions—namely, two early cases of disseminated sclerosis and one case of parkinsonism following epidemic encephalitis. These patients, who, of course, cannot be treated as normals, yielded variabilities of 13, 22, and 5 per cent. Osnato and Killian quote Somach and Halpern who made four serial determinations on four normals. The variability in these normals estimated by us from the published charts was approximately 15, 12, 27, and 16 per cent. The average variability of these nine series of determinations on non-epileptics, six of whom were normals, was about 13·3 per cent.

We have divided the serial determinations we have made upon epileptics into two groups: (1) those which do not include a fit, and (2) those in which a fit occurred during the period in which determinations were made. The average variability in the



Charts representing two series of determinations of the plasma cholesterol of the same patient made on dates separated by two months. The continuous line represents the series in which no fit occurred, the interrupted line a series including a fit, which began as the blood was withdrawn at 2 A.M. The marked fall in the plasma cholesterol between 1·15 and 2 A.M. thus preceded the attack. (Series Nos. 8 and 21.)

former group was 20 per cent., and in the latter 31 per cent. Thus the occurrence of a fit during the period of observation is found to be associated with a variability of the blood cholesterol level which is 50 per cent. greater than when no fit occurs, in which case the variability differs little from the normal.

Consideration of Some Individual Series.

Certain points of interest emerge from a consideration of individual series of determinations.

(1) *Cholesterol Instability Without a Fit.*—Three series of determinations, Nos. 15, 16, and 17, showed abnormal variability—namely, 57, 42, and 35 per cent. respectively, without a fit occurring. Series 15 and 16 were made on the same patient, and in each case because it was thought likely that a fit would occur as the patient exhibited the usual prodromal manifestations. This expectation, however, was not fulfilled, yet the cholesterol instability often associated with a fit occurred.

(2) *Fall in Blood Cholesterol Level Preceding a Fit.*—Robinson, Brain, and Kay made 11 series of determinations preceding an attack and found that in ten of these a fall in the blood and plasma cholesterol

preceded the attack. We have records of 12 series which include attacks, but only four of these are comparable with Robinson, Brain, and Kay's series in that a number of determinations were made before an attack. In three of these four the attack was, as in Robinson's series, preceded by a fall in the plasma cholesterol. The accompanying chart is of interest as illustrating two series of determinations made in the same patient, one including and one (No. 8) not including an attack. It will be observed that the curve which includes an attack exhibits the preparoxysmal fall described by Robinson, Brain, and Kay, previous to which the cholesterol level is high as De Crinis observed. The marked variations occurring in the space of a few hours show how misleading a single determination of the blood cholesterol may be. Determinations separated by only three-quarters of an hour—namely, those at 1.15 A.M. and 2 A.M. differ by 64 mg. per cent. An isolated determination would lead to diametrically opposite conclusions concerning the blood cholesterol level according to whether it was made at the former or the latter time, both of which are within an hour of an attack. It is in the light of such observations that we feel bound to criticise the adequacy of the data upon which Osnato and Killian and Goodall base their conclusions.

Conclusions.

The task of conducting biochemical investigations into epileptics is beset with difficulties, of which the chief is to obtain material immediately before a convulsion. Our attempts to achieve serial estimations of the blood cholesterol before a fit were successful on only four occasions. But we have in addition obtained serial estimations in a number of cases of status epilepticus and serial epilepsy.

Our figures confirm the observation of Robinson, Brain, and Kay that the average blood cholesterol level in epileptics is subnormal, and that of Popéa and Vicol that it is exceptionally low in status epilepticus and in serial epilepsy. We have also found that the blood cholesterol level is more variable in epileptics at about the time of a fit than in periods of freedom from attacks; and that in three out of four cases a fall in the cholesterol level preceded an attack, as Robinson, Brain, and Kay first observed. In our present state of ignorance concerning both the nature of a convulsion and the metabolism of cholesterol we can offer no opinion as to the nature of the association between changes in the blood cholesterol level and the occurrence of fits.

APPENDIX I.

Serial Determinations of the Plasma Cholesterol in Non-epileptics.

1. Normal, male, aged 44. Night of Jan. 28th–29th.

10 P.M.	0·238	2.30 A.M.	0·242
11.30 P.M.	0·238	4 A.M.	0·247
1 A.M.	0·235	5.35 A.M.	0·247

2. Normal, female, aged 34. Night of Jan. 28th–29th.

10.30 P.M.	0·208	2.45 A.M.	0·202
11.45 P.M.	0·202	4.10 A.M.	0·213
1.15 A.M.	0·208	6 A.M.	0·210

3. Early disseminated sclerosis. Male, aged 22. Night of Dec. 21st–22nd.

9.5 P.M.	0·178	3 A.M.	0·166
10.35 P.M.	0·178	4.30 A.M.	0·172
12.5 A.M.	0·156	6 A.M.	0·170
1.35 A.M.	0·166		

4. Early disseminated sclerosis. Male, aged 22½. Night Dec. 21st–22nd.

9 P.M.	0·179	3 A.M.	0·185
10.30 P.M.	0·185	4.30 A.M.	0·208
12	0·179	6 A.M.	0·208
1.30 A.M.	0·166		

5. Post-encephalitic parkinsonism. Male, aged 21. Night of Dec. 21st–22nd.

9 P.M.	0·125	3 A.M., specimen broken.	
10.30 P.M.	0·129	4.30 A.M.	0·128
12	0·125	6 A.M.	0·130
1.30 A.M.	0·124		

Serial Determinations of the Plasma Cholesterol in Epileptics.

Group 1. Series not including an attack.—Nos. 6 and 7 (G. H.). Two serial estimations, first during the morning of July 9th, and next during the night of Nov. 5th–6th. Last fit in No. 6 on July 6th, next on July 11th. Last fit in No. 7 on Oct. 30th, next on Nov. 6th. Drugs (routine): bromide grs. 10 in morning and grs. 20 with grs. 2 of luminal at night.

No. 6. July 9th.		No. 7. Nov. 5th–6th.	
11.30 A.M.	0·119	10 P.M.	0·125
12.30 P.M.	0·119	11 P.M.	0·131
2.30 P.M.	0·119	12	0·119
		1 A.M.	0·125
		4 A.M.	0·122
		5.30 A.M.	0·119

No. 8 (A. C.). During night of Sept. 14th–15th. Last fit Sept. 12th, next on Sept. 17th. Drugs (routine): bromide grs. 20 at night. (See also No. 21.)

10 P.M.	0·131	3 A.M.	0·131
11 P.M.	0·131	4.30 A.M.	0·119
12	0·119	6 A.M.	0·119
1.30 A.M.	0·125		

No. 9 (A. E. B.). Night of Nov. 5th–6th. Last fit Oct. 23rd, next on Nov. 14th. Drugs: bromide grs. 20 and luminal grs. 2, at night.

10 P.M.	0·179	2.30 A.M.	0·183
11 P.M.	0·179	4 A.M., specimen lost.	
12	0·186	5.30 A.M.	0·179
1 A.M.	0·179	(See also Nos. 14, 15, 16.)	

No. 10 (H. B.). Night of July 21st–22nd. No fit for a year. Four grains of luminal were given during the night as an experiment, but it had no apparent effect on the cholesterol level.

10 P.M.	0·108	3 A.M.	0·108
12	0·104	4 A.M.	0·101
2 A.M.	0·108	6 A.M.	0·108

No. 11 (A. G. M.). Night of Nov. 5th–6th. Last fit early morning of Nov. 5th, next on Nov. 24th. No. 32 is from the same patient during a night when a fit occurred. Drugs (routine): nil.

10 P.M.	0·125	2.30 A.M.	0·133
11 P.M.	0·125	4 A.M.	0·109
12	0·125	5.30 A.M.	0·125
1 A.M.	0·130		

No. 12 (S. C.). During day of Nov. 20th. Last fit three days previously, next fit five days later. Drugs: luminal grs. 2 at night.

11.15 A.M.	0·102	3.5 P.M.	0·104
12.5 P.M.	0·099	4.35 P.M.	0·106
1.35 P.M., specimen lost.		6.5 P.M.	0·108

No. 13 (P. E. W.). During day of Nov. 20th, 1928. Major fit a few hours previously; next fit seven days later.

11.10 A.M.	0·093	4.30 P.M.	0·089
1.30 P.M.	0·075	6 P.M.	0·090
3 P.M.	0·088		

No. 14 (A. E. B.). (See also No. 9.) During morning of July 21st. He got up saying he felt he was going to have a fit, but was determined to stop it as he wished to play cricket that afternoon. No fit occurred.

8.30 A.M.	0·204	10.20 A.M.	0·192
9.15 A.M.	0·192	12 noon	0·179

No. 15 (A. E. B.). During night of July 21st–22nd. The sister in charge of the home was confident that a fit would occur during this night, as the patient had been irritable and a fit was due. Last fit June 29th; next August 1st. No fit occurred in July, the average number for other months being three.

8.45 P.M.	0·217	12.15 A.M.	0·156
10 P.M.	0·156	1.45 A.M.	0·168
10.45 P.M.	0·142	3 A.M.	0·165
11.15 P.M.	0·125	6.30 A.M.	0·174

No. 16 (A. E. B.). During night of Sept. 14th–15th. A fit was similarly predicted but did not occur. Last fit August 23rd; next Sept. 20th.

10.5 P.M.	0·147	3.5 A.M.	0·122
11.5 P.M.	0·099	4.35 A.M.	0·147
12.5 A.M.	0·109	6 A.M.	0·139
1.45 A.M.	0·109		

No. 17 (E. S.). During night of July 21st–22nd. This was a patient who was liable to multiple automatic attacks at night, but was then in a period of freedom from attacks. No. 25 is from the same patient when attacks occurred. Drugs: luminal grs. 4 at night.

10.15 P.M.	0·161	3.45 A.M.	0·128
11.15 P.M.	0·174	4.45 A.M.	0·156
12.15 A.M.	0·184	6 A.M.	0·130
1.45 A.M.	0·174		

No. 18 (H. D.). During night of Sept. 14th–15th. Last fit four years previously. Drugs: luminal grs. 2 at night.

10 P.M.	0·128	3 A.M.	0·113
11 P.M.	0·125	4.30 A.M.	0·147
12	0·119	6 A.M.	0·140
1.30 A.M.	0·147		

No. 19 (C. J. H.). During night of Sept. 14th–15th. The attendant at the home felt sure this man would have a fit during the night. The fit occurred at 11 A.M., five hours after the last cholesterol determination. This patient is very rarely convulsed during the day.

10 P.M.	0·128	3 A.M.	0·113
11 P.M.	0·125	4.30 A.M.	0·147
12	0·119	6 A.M.	0·140
1.30 A.M.	0·147		

No. 20. (G. G.). During day of Nov. 20th. Last fit five hours previously. A major fit is usually followed by another in a few hours, but this did not occur on this occasion. Drugs: luminal gr. 1 in morning; bromide gr. 10 at night.

11.5 A.M.	0·119	3.15 P.M.	0·147
12 noon	0·138	4.40 P.M.	0·132
1.40 P.M.	0·114	6.15 P.M.	0·114

Group 2. Series in which fits occurred during observation.—It has not been found easy to collect specimens showing estimations just before fits as their occurrence is so irregular, and so few patients have any but a brief warning. The results which have been obtained are as follows:—

No. 21 (A. C.). During night of July 14th–15th. A major fit occurred at 2 A.M. Fits occurred on nine previous nights and on the following night. No. 8 is a curve from the same patient during a night without a fit.

9.35 P.M.	0·132	1·15 A.M.	0·178
10.5 P.M.	0·114	2 A.M.	0·114*
10.35 P.M.	0·109	2.30 A.M.	0·114
11.5 P.M.	0·119	3.15 A.M.	0·096
11.35 P.M.	0·136	4 A.M.	0·096
12.5 A.M.	0·136	5 A.M.	0·104

*Major fit commenced as this specimen was being collected.

No. 22 (W. H. T.). Night of July 18th–19th, with two major fits at 5.45 A.M. and 7.45 A.M. Previous fit on June 17th. Several fits followed during the two days after the cholesterol determination.

9.30 P.M.	0·132	3.30 A.M.	0·141
10.15 P.M.	0·132	5 A.M.	0·137
11.45 P.M.	0·119	6 A.M.	0·120
1.30 A.M.	0·125	6.30 A.M.	0·120
2.30 A.M.	0·132	8 A.M.	0·120

No. 23 (W. W.). During day, Nov. 21st. Major fit at 10.50 A.M.

10.15 A.M.	0·100	11.15 A.M.	0·094
10.45 A.M.	0·087	11.45 A.M.	0·110

No. 24 (M. C.). During day, Dec. 14th. A few estimations during a long period of serial epilepsy. Fits at 9.35, 11.20, and 11.55 A.M., and 12.27 P.M.

9.30 A.M.	0·109	11.40 A.M.	0·109
10.10 A.M.	0·116	12.30 P.M.	0·110
10.40 A.M.	0·109	1 P.M.	0·111
11.10 A.M.	0·100		

No. 25 (E. S.). During night of Jan. 25th–26th. Attack of automatism at 6.10 A.M. (See also No. 17.)

10.45 P.M.	0·208	4.5 A.M.	0·181
11.35 P.M.	0·214	5.45 A.M.	0·181
1 A.M.	0·211	6.25 A.M.	0·178
2.35 A.M.	0·195		

No. 26 (H. R. M.). During day, July 22nd. These estimations made during a severe attack of status epilepticus. The attack started at 6.5 A.M. and stopped at 7.30 A.M. At 7.10 the patient stopped breathing and was in a very serious condition. Drugs (routine): bromide, grs. 30, at night; luminal, grs. 2, in morning.

7.15 A.M.	0·061	8 A.M.	0·083
7.40 A.M.	0·036	8.45 A.M.	0·093

No. 27 (H. R. M., same patient as 26). These estimations were made in another attack of status, on Sept. 11th, when his condition was not quite so serious. The status began at 5.15 A.M. Thirty major fits occurred between 5.15 and 5.36 A.M. without return of consciousness between. Then fits occurred at 5.45, 5.55, 6.10, and 6.20 A.M., when the attack ended.

5.50 A.M.	0·131	7.20 A.M.	0·104
6.20 A.M.	0·109	8.30 A.M.	0·104
6.50 A.M.	0·108	10.30 A.M.	0·119

No. 28 (L. N. D. L.). During a long attack of serial epilepsy on August 5th: fits occurred at 10.25 and 10.44 A.M. During the previous 48 hours 213 fits had occurred.

10 A.M.	0·104	11.30 A.M.	0·100
10.30 A.M.	0·094	12 noon	0·104
11 A.M.	0·098		

No. 29 (J. D.). Four estimations at the end of a status beginning at 12 noon and lasting 18 minutes. Seven major fits preceded the status, Dec. 7th.

12.35 P.M.	0·110	3 P.M.	0·092
2.30 P.M.	0·110	4 P.M.	0·096

No. 30 (V. T.). Estimations during repeated slight attacks of petit mal which began at 8 A.M. and continued until 11 A.M.

8.45 A.M.	0·125	10.20 A.M.	0·125
9.15 A.M.	0·156	10.45 A.M.	0·135
9.45 A.M.	0·127		

No. 31 (A. H. M.). Dec. 7th. Estimations during repeated attacks of petit mal, beginning at 8 A.M. and ending at 10 A.M., attacks occurring every three or four seconds.

8.50 A.M.	0·114	10.20 A.M.	0·104
9.20 A.M.	0·114	10.50 A.M.	0·131
9.50 A.M.	0·100		

No. 32 (A. G. M.). Night of July 21st–22nd. Fits occurred at 11.57 P.M. and 4.30 A.M. (See No. 11.)

10 P.M.	0·192	1.45 A.M.	0·208
10.30 P.M.	0·192	2.45 A.M.	0·208
11 P.M.	0·166	3.45 A.M.	0·208
11.30 P.M.	0·192	4.30 A.M.	0·240
12	0·166	5 A.M.	0·223
12.30 A.M.	0·178	6 A.M.	0·233
1 A.M.	0·156		

APPENDIX II.

Clinical Notes on Epileptic Patients Investigated.

Nos. 6 and 7 (G. H.). Male, aged 24. Four brothers and sisters died of convulsions a few days after birth, another stillborn. Physically ill-developed and undersized, but much stronger than formerly. Mentally dull. Stricture of posterior urethra (? congenital) treated surgically in 1927. First fit aged 8. About five attacks a month with unconsciousness and partial or complete convulsions. A few automatic attacks in addition.

No. 8 (A. C.). Male, aged 25. Father committed suicide. Mother alcoholic. Father's cousin epileptic. Mentally normal and physically robust. First fit aged 13, ascribed to concussion two years earlier. Large number of major fits, almost all at night, averaging ten a month. Often has fits every night for a week or more at a time. Occasional short attacks of automatism.

No. 9 (A. E. B.). Male, aged 26. Both parents died insane. Formerly of normal intelligence, but now deteriorating mentally. Physical condition good. First fit aged 14. Very large number of major attacks chiefly in small groups.

No. 10 (H. W. B.). Male, aged 25. Severe head moulding at birth. Some asymmetry of chest. Left-handed. Mentally normal. Physically frail. First fit aged 14. Frequent major fits persisted for six years. Recurred a year later in smaller numbers. Last fit recorded Sept., 1927.

No. 11 (A. G. M.). Male, aged 22. Some stigmata. Large and coarse features. Large square hands with thick fingers. Ears, lobules adherent. Slow slurring speech. Some tremor. Poor circulation. Mentally dull and deteriorating. First fit aged 12 (? due to sunstroke). Large number of majors, often occurring in series, lasting a few days and accompanied by some mental confusion. Considerable improvement last six months apparently due to pot. borotartrate.

No. 12 (G. C.). Male, aged 15. Mentally three years retarded and deteriorating. First fit aged 5, occurred within 24 hours of a fracture of the skull. Fits recurred at the age of 10. A year later trephined in right fronto-parietal region and bone, said to be pressing on the brain, removed. No improvement in fit incidence resulted. Now has about seven major attacks a month, the left side being more involved than the right.

No. 13 (P. E. W.). Male, aged 23. Mother hysterical. Physical condition and intelligence good. Mentally rather unstable. First fit aged 3, recurred aged 8. Major attacks have occurred regularly since, with rather increasing frequency, now averaging six a month.

Nos. 14, 15, and 16: see No. 9 above.

No. 17 (E.S.). Male, aged 36. Physical and mental condition good. First fit aged 23, supposed to be due to being blown up and buried a year previously. Major fits, ten in 1927 and two in 1928. Short automatic attacks, characterised by extreme fright and screaming and almost always arising in sleep have occurred for years. The number varies from one up to six a night. The periods of freedom from these attacks are now increasing, and during 1928 he was clear for eight consecutive months. The improvement may be due to luminal, grs. 4, nightly.

No. 18 (H. D.). Male, aged 25. Mother had fits and died of tumour of the brain. Brother died of convulsions while teething. Father intemperate. Mentally a little dull. Physically strong. First fit aged 13, ascribed to a fall.

Very frequent major fits, often in series and sometimes accompanied by grave mental confusion, until in 1924 luminal medication (grs. 2 daily) was started, since when fits have been completely absent.

No. 19 (C. H.). Male, aged 33. Physical condition good. Mentally deteriorating. First fit aged 25, supposed to be due to heatstroke in India. Major fits, all at night, occur at the rate of seven or eight a month.

No. 20 (G. G.). Male, aged 17. One sister insane. Undersized. Face and head asymmetrical. Ears prominent. High palate. Hyper-extensible joints. High grade feeble-minded. First fit aged 10. Mostly major type in groups of three or four.

No. 21 (A. C.). (See No. 8 above.)

No. 22 (W. H. T.). Male, aged 22. Mentally dull and deteriorating. Physically fairly strong. First fit aged 7. Major attacks often in groups of eight or ten spread over three or four days, averaging four or five a month in all.

No. 23 (W. S. W.). Male, aged 12. Physically and mentally normal in spite of frequent fits. First fit aged 11 months, ascribed to fall on the head two months previously. Major attacks occur in groups from one to eight about once a month.

No. 24. (M. C.) Female, aged 14. Physical condition good. Mentally a little subnormal. First fit aged 12 months. Second attack a few years later. During 1928 isolated major fits every two or three weeks, gradually becoming more frequent until the beginning of December, when they averaged 20 a day and are still (1/2/29) continuing at about the same rate.

No. 25 (E. S.). (See No. 17 above.)

Nos. 26 and 27 (H. R. M.). Male, aged 26. Formerly in the Navy. Mentally deteriorating. Physical condition fair. First fit aged 7, said to have followed a fall downstairs. Large and increasing numbers of major fits. Prolonged series of true status epilepticus every few weeks. A case of severe epilepsy.

No. 28 (L. N. D. L.). Male, aged 13. Physically hypotonic. Tremors, some stigmata. Intelligence nearly normal, but conduct very abnormal, especially when fit incidence is high. First fit aged 8. Large numbers of attacks, mostly major in type, occurring very irregularly.

No. 29 (J. D.). Male, aged 28. A sister died of convulsions at 18 months. Feeble-minded and deteriorating. Physically not robust. Slight right hemiplegia. First fit aged 2. Now has about three isolated majors a month, and, in addition, about two attacks of status epilepticus, lasting 15 to 60 minutes, a year.

No. 30 (V. T.). Male, aged 16. Father had convulsions during teething, and mother's mother died of asthma. Mentally and physically normal. First fit aged 7, ascribed to measles. Major attacks average two a month. Also very large numbers of slight attacks consisting of jerking head and eyes to right, and lasting two or three seconds. (These were diagnosed at one time as a sternomastoid tic.) Luminal partly controls the majors, but neither it nor any other drug influences the minor attacks. Occasionally free from minor attacks for a day or two, but more often they occur almost continuously for some hours.

No. 31 (A. H. M.). Male, aged 14. Family history clear. Physically and mentally normal. Many scars due to falling in attacks. First fit aged 7. Very frequent short attacks with loss of consciousness. Often falls. Rapid return of consciousness. May have a day or two free from attacks; on other days attacks are practically continuous. Bromide and luminal medication useless. ? A case of pyknolepsy.

No. 32 (A. G. M.). (See No. 11 above.)

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COMPLICATIONS AND MORTALITY OF APPENDICITIS.

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APPENDICITIS, like many other evils, appears to be a by-product of our modern, high-speed, material "civilisation." At any rate, that is the impression left after reading the painstaking researches of Short[1] and others. In spite of the advances of surgery the total death-rate for the disease is not diminishing in this country, while in the United States it increased 30 per cent. in the first 20 years of the century.

TABLE I.—*Mortality per Million from Appendicitis* (Willis,[2] Adams,[3] and H. H. Greenwood[4]).

	U.S.A.			*British Isles.*				
Year ..	*1901*	*1911*	*1921*	*1913*	*1918*	*1921*	*1924*	*1927*
	110	120	144	69	66	72	74	70

The figures given in Table I. are not the same as the case-mortality and do not explain whether the disease is more common or whether it actually has a higher mortality. As it was rare before the latter years of the last century there can be little doubt that it is now more common. Is the increasing mortality in the country where the Ochsner treatment had its origin due to this expectant treatment? This seems hardly likely from the figures given by institutions where it is practised. More probably the disease has become more common or more severe in character.

Comparison with other Abdominal Urgencies.

Some years ago I investigated the results at the London Hospital, taking two periods of a few years each, first about 1900 and then about 1914. The percentage mortality was as shown in Table II.

TABLE II.—*Percentage Mortality.*

Year.	Appendicitis.	Perforated gastric ulcer.	Intestinal obstruction.
1900	27	66	50
1914	6	40	39

I ascribe the improvement to recognition of the importance of early operation and to better after-treatment, principally the use of Fowler's position. While the statistics for institutions have improved, the general death-rate from these diseases has not fallen proportionately. The figures given by Willis[2] for the United States and Greenwood[4] for this country are as given in Table III.

TABLE III.—*Mortality per Million.*

	U.S.A.			*Great Britain.*		
Year.	Appendicitis.	Hernia and obstruction.	Year.	Appendicitis.	Hernia.	Obstruction.
1901 ..	110	130	1918 ..	65	64	81
1910 ..	120	120	1927 ..	70	50	64
1921 ..	140	106				

The falling mortality of intestinal obstruction is curious, for in hospital cases the improvement seems so small compared with that obtained for cases where the peritoneum is involved—viz., appendicitis and perforated gastric ulcer. During the same number of years I met 1000 cases of appendicitis and 150 of intestinal obstruction and had practically the same number of deaths in each group—viz., 50—which agrees closely with the published figures.

Case-mortality.

I should put the case-mortality at about 5 per cent. or rather more, judging from my own experience for

the past 20 years and the results of other surgeons who give long series. An analysis of cases gives the impression that there is a great variation in the severity of the disease from time to time (Table IV.).

TABLE IV.—*Comparison of Case-mortalities.*

—	Cases.	Mortality per cent.	Date.
Grey Turner[5] ..	1339	5·7	1909–1929
McNeil Love[6]	607 expectant 2706 immediate	3·8 6·7	1920–1924
Gatch and Durman[7]	262	7·2	1924
Greenwood[4] ..	206	—	1927–1929
Warren	1072	6·0	1909–1929

Factors likely to affect the mortality are: (*a*) period, (*b*) age, (*c*) sex, (*d*) accidental complications, (*e*) severity of infection and natural complications, and (*f*) treatment.

(*a*) *Period.*—In my own cases there was a notable difference in series at different times (Table V.).

TABLE V.

Date.	Cases.	Bad cases (per cent.).	Secondary operations (per cent.).	Mortality (per cent.).
Pre-war, 1910–14 ..	433	9·2	3·5	4·3
War, 1914–17	268	10·4		7·4
Immediate post-war, 1919	184	11·4	6·5	8·7
Late post-war, 1921–28	187	9·6	1·5	4·8

The cases labelled "bad" were those with spreading peritonitis or intestinal obstruction or both. It is difficult to grade cases according to severity; the surgeon has to go partly by the general and local condition of the patient and partly by what he finds at operation. Since it is, as a rule, advisable to explore as little of the abdomen as is compatible with dealing with the mischief, it is often impossible to say how far the peritonitis has spread. Grey Turner, in a very interesting communication, reports 1339 acute cases, of which 116 had diffuse peritonitis or severe primary complications, such as intestinal obstruction or pylephlebitis, with a mortality of 33 per cent. He separated off groups of cases with flank peritonitis or localised abscess which, together with simple acute cases—i.e., those without peritonitis (1160 in number)—had a mortality of 2·9 per cent. My observations and notes are not accurate enough for such subdivision, but of 1072 acute cases there were 107 with diffuse peritonitis or obstruction or a combination of these, with a mortality of 41 per cent. The remaining 965, including abscesses, localised peritonitis, and simple inflamed appendices, showed a mortality of 2·6 per cent., which agrees closely with Turner's figures for this class of case.

The 1910–14 cases were consecutive at the London Hospital, as were the next group during the war. There is a higher mortality and slightly higher percentage of severe cases among the second group, and I suggest that this is caused by malnutrition and the absence of many abled-bodied patients who would probably have a lower mortality (see under Age). As a matter of fact, the latter would probably be cancelled out by the greater proportional number of women, whose resistance seems to be higher. The next group forms an interesting series. They occurred immediately after the war, when deficient feeding and the great influenza epidemic may have lowered the resistance of the nation. In addition the series includes practically all the night emergencies at the London Hospital for some months. All these factors together probably account for the poor results, for although the incidence of severe cases only showed an increase of 2 per cent. the patients responded badly to treatment, and there were severe and unusual complications, such as secondary hæmorrhage, wide sloughing of the abdominal wall, and an unusual number of secondary operations—viz., 6·5 per cent., compared with 3·5 per cent. for 1910–17.

The next series, for contrast, represents a practice in an agricultural district. The figures suggest a mortality about the same as that of London in peace-time, but the true mortality is lower, for amongst the nine cases which died the following things happened.

1. A woman who had had an acutely inflamed appendix removed without drainage had done well and was about to get up 14 days after operation when she became acutely ill with signs of some great abdominal urgency. Laparotomy revealed thrombosis of the inferior mesenteric vessels and gangrene and carcinoma of the sigmoid colon.

2. An old man of 65 with myocardial degeneration and fibrillation had an acute appendicitis with abscess. The appendix was removed, and the abscess drained and healed in a few days, but 16 days later, before he left hospital, he succumbed to his cardiac condition.

3. A girl of 6 developed a general peritonitis in 36 hours. At operation there was turbid fluid and lymph all over the intestines and the appendix was slightly inflamed; she died in a few days. It was probably a case of pneumococcal or streptococcal peritonitis, but in the absence of bacteriological evidence I felt obliged to include the case in the appendicitis series.

Excluding these cases, the mortality is a little over 3 per cent.

(*b*) *Age.*—Next to early diagnosis the patient's age is the most important factor affecting the mortality (Table VI.).

TABLE VI.

Age.	Cases.	Complicated cases.	Died.	Mortality per cent.
0–5	21	5	3	14
5–10	122	13	11	9·0
10–15	197	13	12	6·0
15–20	191	20	11	5·7
20–30	284	17	10	3·5
30–40	131	9	3	2·3
40–50	63	14	6	9·5
50–60	47	10	7	14
60–70	11	3	3	37
70–80	7	1	—	—

The mortality diminishes rapidly after the first decade and slowly falls until about the fortieth year, when it again rises sharply. It is curious, but probably only a coincidence, that none of the septuagenarians died. The reason for the greater mortality at the two extremes of life are: (1) The difficulty in diagnosis in children, in whom early appendicitis is often mistaken for dietary indiscretion and unfortunately often treated by parents with a purge. (2) The young also show an inferior resistance to acute infections—e.g., peritonitis. (3) The more elderly seem to have diminished sensibility, so that they take little notice of pain in the abdomen until their condition has become serious. The pain of an incipient appendicitis is probably less severe than that of an intestinal colic from some dietary lapse, and is disregarded. It is surprising how slightly persons of a certain age show the severity of the trouble either subjectively or objectively; for instance, a man of 58 was regarded by his doctor as a case of subacute intestinal obstruction as he had had neither increased pulse-rate nor fever for a week. Two days before I saw him he was relieved by an enema, shortly after which he began to have pain and distension. When I saw him he was distended, and my impression was that of a subacute obstruction which had become acute, probably because of a growth in the colon. Operation, however, revealed fibrino-purulent peritonitis and obstruction from a gangrenous appendix. Cases like this are unfortunately not uncommon, and have a high mortality.

TABLE VII.

Sex.	Number.	Died.	Mortality per cent.
Male	575	40	7
Female	480	25	5·

(*c*) *Sex.*—As might be expected, the female sex, with its greater power of passive resistance, shows a slightly lower mortality (Table VII.).

(*d*) *Accidental Complications.*—By these I mean accessory diseases which either lower the resistance or actually kill the patient, who may have practically recovered from his appendicitis. Mention has already been made of myocardial degeneration, thrombosis of the mesenteric vessels, and gangrene of the colon; to these may be added diabetes, perforation of a duodenal ulcer, and pulmonary embolism. Most of these cases should really be excluded, but it is invidious to make a distinction. These casual complications formed one-sixth of the total deaths.

(*e*) *Direct Complications.*—These are peritonitis, intestinal obstruction and combinations of the two, and are the important causes of death in appendicitis. Direct complications form a large percentage of the whole. In 1072 cases there were 107 direct complications—i.e., 10 per cent., and of these 44 died—i.e., two-thirds of all the deaths. It is often difficult at operation to settle the degree of spread of peritonitis. I have retained the term "spreading peritonitis" for cases where there was matting of intestines by recent lymph with loculated pockets filled with pus, more or less foul, together with redness and distension of the intestine. The type of case where there is merely turbid or semipurulent fluid, widely disseminated amongst the intestines, but without lymph and with but little redness or distension of the intestine (which clinically often suggest peritonitis) have not been included under this heading. Such cases mostly have a fairly smooth recovery, though they may pass into the more severe type. The rate of spread and virulence of a peritonitis cannot be measured in time, but only by the severity of the infection and the resisting powers of the individual's peritoneum. It is almost impossible to say whether a condition of local peritonitis is an early stage of a severe infection, which will probably advance rapidly, or a later stage in a condition which is to some degree held under control by the natural defences of the peritoneum. A good many cases of spreading peritonitis recover; my impression is that those which die are either late, owing to neglect or wrong diagnosis, or especially virulent infections—e.g., streptococcal cases.

Intestinal Obstruction.

These cases form an interesting group, to which insufficient attention has been directed. In 1924 [8] I collected my cases and found that I had met 34 during a period in which I had seen 1011 cases of acute appendicitis, but some of the cases had followed operations by other surgeons. In the present series of 1072 patients there were 32 cases of obstruction or obstruction combined with peritonitis. In 1924 I reported 180 cases of obstruction; 68 were strictures, 40 intussusceptions, and 54 bands and kinks. Of the last group no less than 34 were directly due to appendicitis. I do not know how many I have missed and confused with peritonitis. During the discussion on my paper one surgeon of great experience stated that he had never met with the condition, which makes me think that it is often confused with peritonitis and paralytic ileus. The literature on this subject is not extensive; Harrigan [9] describes 8 cases, of which only 3 were immediately post-operative; Rayner [10] notes 3 cases out of 126 cases of appendicitis; Carlson and Marshall [11] among 875 cases of appendicitis found 15 cases of obstruction, of which 8 were immediately post-operative. They make the pertinent remark that possibly a good many cases labelled "acute dilatation of the stomach" are really obstruction of the small gut by lymph bands and peritonitis.

Clinically cases of obstruction due to appendicitis fall into two main groups: (1) primary, and (2) post-operative; the latter may be further divided into immediate and late. By immediate I mean cases which demand attention whilst still in hospital for the primary operation. The late post-operative cases may occur weeks, months, or years after the operation or attack of appendicitis and do not come into the discussion here, though they form a notable percentage of all cases of obstruction of the bowel due to bands and kinks.

Primary Obstruction.

As a rule the whole affair is recent and acute; the symptoms are like those of acute obstruction, but probably with some fever and localised tenderness and resistance in the right iliac fossa, suggesting something more than a simple obstruction. Of this type the following is a good example:—

A woman aged 70 had been ill for 24 hours with repeated vomiting, abdominal distension, and constipation. The temperature was subnormal, the pulse normal, and the right iliac fossa tender. Laparotomy was performed immediately, and showed an acutely inflamed appendix adherent to and kinking the lower ileum, with marked distension of the gut above and emptiness below. Removal of the appendix from its lymph bed automatically released the gut and the patient made a good recovery.

A similar clinical picture may be produced by cancerous obstruction of the lower colon with distension of a cæcum, which is becoming ulcerated and perhaps beginning to leak. In middle-aged or elderly persons the distinction between these two conditions is extremely difficult. The following is a less common type:—

A boy aged 8 suffered from belly-ache and occasional vomiting for a month. His appetite was bad, his temperature irregular, and he sweated at night. For two days before I saw him the vomiting had been more urgent and the bowels confined. When seen he had a typical abdominal facies, marked distension of the abdomen, and visible peristalsis of small intestine; his temperature was 100°F. and his pulse-rate 100. Laparotomy was done immediately, and it was found that two or three feet of the ileum immediately above the cæcum were kinked and matted by adhesions. The ileum above was dilated and the colon below collapsed. An acutely inflamed appendix was removed from the middle of the matted coils of intestine and adhesions broken down. As it was uncertain whether the intestinal contents could pass along such a length of damaged intestine, a lateral anastomosis was made between the ileum, above the kinked part, and the cæcum. A valvular cæcostomy was done at the same time and the patient made a good recovery.

Post-operative Obstruction.

This type is pathologically similar to the last, but in addition there is frequently suppurative peritonitis—i.e., pockets of foul pus between adherent coils of intestine. Clinically, in my experience it is commoner and more fatal than the primary variety. The danger is in part due to the greater difficulty of diagnosis, for it is not easy in the early stages to distinguish atonic ileus or early-spreading peritonitis from obstruction caused by a recently formed lymph band. This is partly because the patient has been ill longer and has already been through one operation, so that his vitality is depressed. Complete diagnosis may not be easy, but is less important in the primary cases, since in these it is usually fairly clear that the condition is one of abdominal urgency with signs pointing partly to obstruction and partly to some inflammatory affection, and immediate operation is definitely indicated. The main point is to open the abdomen by the paramedian rather than the iliac incision, so as to give plenty of room if adhesions have to be dealt with or an anastomosis formed.

In the post-operative type diagnosis may be difficult and is extremely important, for, on the one hand, a true mechanical obstruction has to be relieved, and, on the other, inflamed intestine should not be handled and abused if the condition is really a simple peritonitis. The sudden onset of paroxysmal abdominal pains, with rising pulse-rate and falling temperature, in a patient who has been going on smoothly after the original operation is suggestive. When associated with bilious vomit, becoming brown, and a soft abdomen, there is almost certainly obstruction, and there should be little hesitation in operating. Visible peristalsis of the small intestine is, of course, decisive, but to wait for its appearance is to incur grave risks, for it occurs late in the more acute obstructions. Where there is a mixture of obstruction with suppurative peritonitis, diagnosis and treatment are alike difficult, but I cannot help thinking that in some cases expectant measures are adopted when operation would be better.

The following is a fairly typical example :—

A boy of 17 who had been ill for one day was operated on and a gangrenous appendix was removed ; there was foul pus in the pelvis, which was drained. Three days later, after good progress, there was severe abdominal pain and vomiting, but an enema gave relief. The next day, as pain and vomiting recurred, the abdomen was opened and the small intestine was found distended above a mass of matted intestine with pockets of pus. The adhesions were freed, a valvular ileostomy with catheter was made in the ileum above the obstruction, and a pelvic drain was reinserted ; the patient made a good recovery and was out in a month. Catheter drainage of the ileum in such cases is a life-saving measure and the wound usually heals up in two to three weeks at the latest.

I cannot help thinking that some of the cases called "post-operative obstruction" really had obstruction at the start, but, owing to the small amount seen at operation, obstruction was missed. In the worst class of case the surgeon is on the horns of a dilemma, since too much zeal in breaking down adhesions may spread infection further, yet adhesions must be freed if they cause obstruction.

(*f*) *Treatment.*—We are all agreed that the diseased appendix is best removed, but there is some diversity of opinion as to when exactly this is best done. The main point at issue is the treatment of cases which have been in progress some time, for practically all surgeons admit that in early cases immediate appendicectomy is the safest course. In cases which have lasted some time the bulk of surgeons advocate immediate operation in almost every case, but there is quite a considerable school which adopts expectant measures based on the teaching of Ochsner. These consist mainly in placing the patient in the Fowler position, giving no fluid by mouth, but only rectal saline as nourishment, and possibly also morphia, but only operating if the condition becomes worse. Very good results are claimed by the advocates of this method, but it must be remembered that cases so treated are to some degree selected and very possibly include only those which would have done equally well if operated on immediately. Unless the figures include all the appendicitis cases met with over a reasonably long period the conclusions are not sound. Adams[3] gives the following figures for comparison, quoting Love's statistics for the London Hospital (Table VIII.).

TABLE VIII.

	Cases Treated Expectantly.			*Cases Treated by Immediate Operation.*		
—	No.	Died.	Mortality per cent.	No.	Died.	Mortality per cent.
London Hosp.	341	12	3·5	1677	98	5·8
St. Thomas's..	214	9	4·2	901	76	8·4

Adams points out that in the latter series there were over 400 cases of general peritonitis with a mortality of 20–30 per cent., and raises the question whether the series treated expectantly contained the same proportion of severe cases—i.e., whether it was a straight series without selection. Deaver and Magown[12] give copious statistics from the Lankenau Clinic from which I quote a few figures.

Of 5488 operations for acute appendicitis, from 1901 to 1919, 327 died.

1901–05	.. Mortality percentage	.. ..	10·5
1906–10	.. ,, ,,	.. ..	5·6*
1910–15	.. ,, ,,	.. ..	3·7*
1915–21	.. ,, ,,	.. ..	4·2*

* Ochsner treatment adopted.

In 1918 the mortality was 5·2 per cent., showing the same increase from war and influenza that I found in my own cases. Ashurst[13] gives an account only of severe cases—i.e., those which were drained, as follows : immediate operation, 210 ; mortality, 10 per cent. ; delayed operation and Ochsner treatment : mortality, 35 per cent. Of the latter group, six cases died without any operation, being too ill for it.

Ashurst gives a useful hint about the diagnosis of diffuse peritonitis—viz., that rigidity alone is often associated with the presence of an exudate of turbid fluid in the peritoneum, which is relatively innocuous and often does not need drainage, but if distension is present as well there is probably a definité fibrino-purulent peritonitis. He shrewdly adds that surgeons who practise delay may claim as successes due to delay cases which would do equally well if treated by immediate operation ; "only those who look inside the abdomen can know the true condition of affairs during the acute stage." Willis[2] quotes Ochsner as having a mortality of 4·5 per cent. in the early years of the century and one of 2 per cent. in 1924, but gives no details of the number of cases and whether they were a straight sequence.

The advantage claimed by the upholders of expectant treatment over immediate operation seems therefore to be not more than 2–3 per cent., which is less than the differences I have found in my own cases, all treated on very similar lines in series occurring at different times, so that it is hard to believe that waiting is any great advantage. Love,[6] who advocates expectant treatment, does not seem wholly wedded to this method, as he states that in general peritonitis appendicectomy is advisable if possible. It is clear that the cases treated on expectant lines are selected cases and not a straight series. In the same way a surgeon might claim that drainage is bad because the mortality of drained cases is 10 per cent., while of undrained it is about 0·75 per cent.

Time of Election for Operation.

A good deal of stress has been laid upon the danger of operating at a certain period of the disease. This is put variously ; perhaps the most usual is to regard the third to fifth day as the time to avoid operation. Personally I find the disease advances with very varying rapidity ; some cases are no further advanced in three days than others in 24 hours. Some have spreading peritonitis after a day ; others after a week have little but lymph round the inflamed appendix. There can be little doubt that many patients do not notice the earlier symptoms or put them down to dietary indiscretions, and only seek advice when the appendix is perforated or a localised abscess has burst and the condition is serious. Adams[3] remarks that there may be marked pathological changes in an appendix which causes no pain at all and may certainly give rise to no vomiting ; if so, the patient may easily make an error of 48 hours in the length of the history he gives. With this view I entirely agree. The expectant method demands enormous care in watching for any adverse symptoms which may suggest immediate operation. Pulse-rate and temperature will have to be taken two-hourly and the abdomen must be frequently inspected ; even then mistakes are easy. One case of this type always recurs to me.

At a children's hospital the resident one morning said to me : "I wish you would see a child who, I thought, had appendicitis last night, but to-day I am not at all sure about it, and think I may have been mistaken." I examined the boy and could find no tenderness or rigidity of the abdomen ; there was no pain and the pulse and temperature were normal. Knowing the resident to be a careful man I replied : "Although I can find no signs now, since you found them last night I believe it is wisest to operate." I did so, and found a completely gangrenous appendix with little or no effusion. The child made a speedy recovery ; waiting might have meant disaster.

I have met with many similar cases though seldom quite so dramatically. Another danger arises from mistakes in diagnosis. I well remember a former colleague of mine telling a story against himself. He had decided to adopt the plan of waiting between the third and fifth day in cases of appendicitis with a mass in the right iliac fossa. The first case on which the plan was tried proved to be one that did not improve; so laparotomy was done next day and revealed an intussusception. A twisted ovarian cyst may mislead in the same way, though this is a less serious error. A distended and leaking cæcum above a cancer of the colon, or a slowly leaking duodenal ulcer, might be

mistaken for appendicitis, with disastrous results if the patient be treated on expectant lines.

I feel that one cannot judge the condition of the appendix with sufficient surety by the clinical progress of the case, for the condition found at operation is frequently more severe than would be expected from the physical signs. (The converse also is true, but of less consequence.) Expectant treatment can only be used in institutions where the patient is constantly under skilled observation, and even then it may have to be given up for active measures, with loss of valuable time and additional danger. My impression is that delay should only be practised where conditions are very unfavourable for operation, either because the patient has some additional disease such as pneumonia, nephritis, and diabetes, and the appendicitis does not appear to be severe, or where the local conditions, as at sea or far from civilised appliances render the success of any operation problematical.

Scope of the Operation.

It is very important to consider how much should be done in the more severe cases. It is just as important not to do too much as to do too little. In the earlier cases the appendix can usually be removed with little difficulty, but where the disease has been present for some time it may be wiser simply to drain any abscess (it should be noted that it is easy to miss loculations of pus, where more than one are present) and leave the appendix for a future operation. I find that I fail to remove the appendix in about 1 case in 20. Judging from the remarks of Love, some surgeons are too anxious to remove the appendix at all hazards in every case, and thus sometimes do harm by breaking down adhesions and spreading infection. If the appendix does not come to hand in about five minutes, it is best to be satisfied with opening the collections of pus in cases where the adhesions are many, dense, thick, and œdematous. The only reason for going further is the relief of obstruction, where this is present, by division of adhesions and possibly by cæcostomy or ileostomy. Except in the more difficult cases such an operation will not take more than 10 to 15 minutes and may not take more than five.

The Incision.

This will depend on the type of case and the habits of the surgeon. The muscle-splitting, paramedial, and pararectal lines of approach all have staunch advocates, and I note that Grey Turner [6] recommends muscle-cutting in the right iliac fossa for cases where drainage is needed. I was not impressed with the results of this method which I used to see when I was house surgeon, and I determined never to use it. In those days it led to trouble from vomiting and prolapse of intestine. But this may have been due to the use of heavy gauze packs as well as to the type of incision. I have made more use of the muscle-splitting incision than any other, but where the diagnosis is uncertain or complications, such as obstruction are likely, and in women, I frequently employ the paramedial, displacing the rectus muscle outwards. Some surgeons think that drainage through the muscle-splitting incision is poor, and suggest a suprapubic stab, but I have not been struck by any great advantage in this. In about 4 per cent. of all cases in this series there was need for a secondary operation for draining a residual abscess or for obstruction. The advantages of an incision in the right iliac fossa in the early definite cases are obvious, as there is far less risk of spreading infection amongst the small intestines; moreover, it is much easier (and therefore safer) to reach the appendix, and by extending the splits in the layers of muscles widely a very free exposure can be obtained. Where the condition is advanced the problem is somewhat different, as the surgeon must be able to cope readily with pockets of pus disseminated amongst the coils of small intestine and to relieve any mechanical obstruction. The nicest judgment is needed if he is to exert the right amount of interference in these patients, for in one case the adhesions may be walling off infection from susceptible areas and in another a quite recent and apparently delicate band of lymph, which is broken by a touch, may be obstructing a loop of ileum quite as effectively as an organised fibrous band. He should keep a very sharp look out for coils of distended small intestine, and if, when he has broken down lymph bands, the coils do not readily empty into the lower intestine, a valvular enterostomy may save life and be useful both for the administration of saline and the evacuation of gas and liquid fæces.

Drainage.

The percentage of cases drained is some criterion of the severity of the series, but allowance must be made for the predilections of individual surgeons, whose ideas of when to drain vary considerably. Greenwood,[4] who must be congratulated on recording the most successful series of cases, gives the impression that he drained only 18 per cent. and that Grey Turner drained 26 per cent. (My interpretation of the latter's communication is that more than half were drained, and expresses surprise that Flint records 1080 acute cases from Leeds, of which presumably half required drainage. I have drained about half my cases. All this goes to support my view that appendicitis varies in severity from causes associated with time and place. Greenwood advocates draining through the loin when pus is present there. This sounds reasonable, but in my earlier days I remember seeing this done fairly often and always being struck by the way pus refused to come out of a loin tube, even when the patient was lying on his back (I refer to the days before Fowler's position was employed), while it came readily through a tube in the right iliac fossa. Consequently I have never employed this mode of drainage.

Drainage through a muscle-splitting incision is said to be bad, but I have not found it so. In about 4 per cent. of my cases a secondary operation was needed for residual abscess or obstruction, and, while it is true that some of these were in patients operated through the right iliac fossa, others had been done through the paramedial route. My usual plan is to keep a tube down into the pelvis (when this needs draining) for two days and then shorten the tube, so that it just goes through the abdominal wall; I usually omit it about two days later. If the tube comes out too early a residual abscess may form, but if it is left in too long the pressure may cause a fæcal fistula. More than one-third of the cases of obstruction occurred before any operation was done, but the possibility of a drainage-tube causing complications such as obstruction makes it important to take the tube out as soon as possible.

Conclusions.

1. Appendicitis appears to be developing a more severe character or is more common.

2. The disease shows a considerable variation in its severity, depending on time and place; the mortality in my experience varies from 3 to 10 per cent.

3. Expectant treatment may give good results in certain hands, but as a general measure its advantages are not proved and its wide adoption might lead to further disasters. The mortality is greatest in children, who are certainly not cases for expectant treatment, owing to the rapid and insidious way in which complications, such as peritonitis, develop in young subjects, and their liability to acidosis from starvation.

4. Early diagnosis and immediate operation are the counsels of perfection, but failure to diagnose early is by no means always the fault of the practitioner, for in children and old people the diagnosis may be quite difficult, and many persons regard a stomach-ache too lightly and do not send for the doctor till they have developed a well-marked peritonitis.

5. The main causes of death are peritonitis and mechanical obstruction; the latter can be very largely prevented by suitable technique at operation, and a careful watch should be kept for this important complication.

(*Bibliography at foot of opposite page.*)

Clinical and Laboratory Notes.

ACCESSORY SPLEEN WITH RECURRING TORSION OF ITS PEDICLE.

By R. Charles Alexander, F.R.C.S. Edin.,
LECTURER IN CLINICAL SURGERY IN THE UNIVERSITY OF ST. ANDREWS; SURGEON, ROYAL INFIRMARY, DUNDEE.

Cases of accessory spleen giving rise to symptoms which call for surgical interference are rare. In 1914 I published, with Archibald Romanes, a paper[1] recording a case which came under our observation and giving a short review of similar cases from the literature. The interest of the present case is enhanced by the fact that, owing to its resemblance to the former case, a correct preoperative diagnosis was made.

A housewife, aged 35, was admitted to my wards in the Dundee Royal Infirmary in June, 1926, on the recommendation of Dr. J. Wilson of Anstruther. She complained of recurring attacks of pain in the abdomen, and of a lump, which she had felt in various situations in the abdomen. The pain was of a burning character and the attacks lasted about three days. During the two years previous to admission, the interval between the attacks had gradually diminished from six to two months. The pain was situated above and to the left of the umbilicus, and usually came on when she was tired; it was more severe if it coincided with a menstrual period. It was not accompanied by vomiting, but there was sometimes a feeling of nausea when she stooped. During the attacks of pain she had felt a lump in the upper abdomen "about the size of a small orange," and she volunteered the statement that the lump was larger during the menstrual period. Between the attacks she felt well; there was no dyspepsia, and the bowels moved freely. She had lost weight during the preceding four months. There was a family history of tuberculosis, and after the birth of her first child some years ago she had had a bilateral pleural effusion which had taken some time to clear up.

She was a woman of poor physique and looked rather tired. The abdomen moved freely, and from time to time one could grasp a firm spherical tumour, about the size of a tangerine orange. It was tender to touch and could be moved rather freely about the abdomen. There was no ascites and the percussion note showed no enlargement of the liver or spleen. Rectal examination was negative. Radiographic examination with and without barium failed to reveal any abnormality in the alimentary tract. The blood count showed some increase of the red cells—viz., 6,050,000.

I was encouraged by the resemblance to the former case to make the preoperative diagnosis of accessory spleen with recurring torsion of the pedicle. The possible alternatives were an omental cyst, or a mass of tuberculous glands. The latter would possibly have shown calcified areas in a radiogram. The increase in size of the tumour during the menstrual period suggested that it was of glandular origin.

On June 13th laparotomy was performed under general anæsthesia. A perfectly spherical red tumour was found attached by a thin pedicle about three inches in length to the centre of the anterior aspect of the gastro-hepatic omentum, the pedicle allowing the tumour to swing freely in the abdomen. The pedicle was ligated and the spleniculus removed. The spleen was normal in size and position, and no other spleniculus was detected. The other abdominal viscera were normal, except the appendix, which was long and buried in adhesions. This was removed and the abdomen closed. Recovery was uneventful.

It seems probable that up to two years before the operation the spleniculus was sessile and gave rise to no symptoms, their onset being determined by the formation of the pedicle, torsion of which produced congestion in the organ with resulting pain. Prof. L. R. Sutherland reported that the section on microscopic examination showed the appearance of normal spleen; there was no evidence of hæmorrhages or fibrosis, as was seen in the specimen from the previous case.

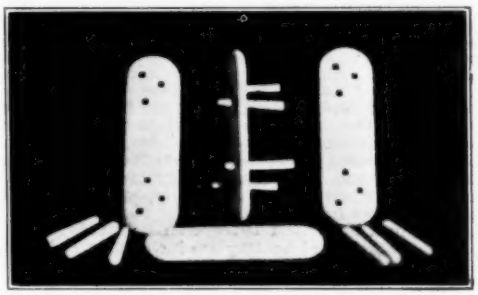
Since the publication of the previous paper, I have sometimes noted the presence of small spleniculi at operations. None has been larger than a filbert. I have occasionally found them in relation to the greater curvature of the stomach when I was performing partial gastrectomy frequently in the pedicle of the spleen near its hilum, and occasionally in the great omentum. I have seen no record of other cases similar to the two I have recorded, but R. Finaly[2] notes the presence of an accessory spleen in the sac of a left inguinal hernia, the spleen being attached to the upper pole of the epididymis. He quotes a case reported by Sneath where an accessory spleen simulated a third testis and was connected by fine cord-like attachments to the normal spleen.

[1] The Lancet, 1914, ii., 1089.

THE USE OF BONE-PLATES IN THE TREATMENT OF FRACTURES.

By H. H. Greenwood, M.B. Lond., F.R.C.S. Eng.,
CONSULTING SURGEON TO THE GREAT WESTERN RAILWAY HOSPITAL, SWINDON.

During 1920, when I was visiting surgeon on the staff of the Orthopædic Hospital, Beckett Park, Leeds, I used bone-plates and bone-pegs in six cases of ununited fracture of the humerus and showed the later successful cases at the Leeds and West Riding Medico-Chirurgical Society. The idea originated in a paper by Gallie and Robertson,[3] although Hey Groves[4] had



Bone-plates and pegs.

previously used bone-plates fixed by metal pegs in a somewhat similar manner. To avoid the elaborate and tedious manufacture of bone-screws with the tapping-out of corresponding holes in the bones, I used bone-pegs square in section and tapering slightly. I found that these grip sufficiently firm to hold the fractured ends in good apposition and can be expeditiously inserted. I have continued to use them for certain cases ever since and find that their sphere of usefulness lies mainly in the more deeply seated fractures, where a subsequent operation for the removal of a metal plate which has, so to speak, outworn its welcome, is a serious undertaking. For the more easily accessible

[2] Nederland. Tijdschr. v. Geneesk., July 24th, 1926, p. 397 (quoted in Brit. Med. Jour. Epitome of Current Med. Lit., 1926, ii., 49).

[3] Gallie, W., E. and Robertson, D. E.: Brit. Jour. of Surg., 1919, vii., 211–262.

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fractures, such as those near the distal end of the radius, ulna, or tibia, the metal plate can still claim advantages which scarcely need emphasising.

The accompanying photograph illustrates plates and pegs. The pegs are shown inserted in the upper plate in position, but they are too large for the holes and should sink through for about three-quarters of their length. After being driven home the projecting ends are nipped off with sharp bone-forceps and the rough end filed down level with the plate. Care should be taken not to use too powerful a blow when driving in the pegs, lest the plate be split. The bone-plates are slightly hollowed on the under surface to allow of close apposition to the bone. Both plates and pegs are prepared as Mr. Hamilton Bailey[5] directs, that is, by boiling for 20 minutes on three successive days. Their strength is apt to become impaired by too prolonged boiling.

A CASE OF SPASM OF THE CERVIX UTERI.

By L. J. Green, M.R.C.S. Eng.

I should like to know whether the following case is to be regarded as exceptional.

The patient, aged 25 and healthy, had had one previous uneventful confinement, and was first seen in labour at 8 A.M. The abdomen was much distended, the os four-fifths dilated, the membranes bulging but unruptured, and no part could be felt presenting. Pains, felt only in the lower abdomen, were occurring every three minutes. The patient, having had no sleep, was tired out, labour having commenced at 6 P.M. on the previous evening. She was of a babyish type with small power of endurance and control, moaning and crying for help. The fœtal heart was heard beating to the left of the umbilicus. At 10.15 A.M. the condition of the os and membranes was unaltered, but the head could be felt presenting and the pains were stronger and felt in the sacral region.

At 1 P.M. the patient was screaming for "help," with such phrases as "take it from me." As the os seemed fully dilated and the patient was much exhausted and the abdomen was distended, it was deemed advisable to rupture the membranes. After doing so the hand was temporarily withdrawn from the vagina and the patient immediately re-examined to determine the exact presentation. I was astonished to find that the os was now only two-fifths dilated, the sensation imparted to the fingers unmistakably suggesting considerable muscular tone. I was so astonished that I examined the patient with unusual persistence and deliberation. It seemed certain that the previous diagnosis of full dilatation of the os must have been mistaken and that the patient was in reality in the early part of the first stage of labour. In view of her sleepless night and her poor psychological make-up I decided to adminster a sedative. She was informed that delivery was some distance ahead, advised to compose herself, and given omnopon gr. ½ hypodermically, whilst a hot enema was ordered to clean out the bowel, which was discharging a little fluid fæces with each pain. The fœtal heart was then heard beating one inch below and to the left of the umbilicus.

At 2.15 P.M. there was an urgent telephone message. A live, male child of 8 lb. had been born precipitately.

The only explanation of this case appears to be that following the manual rupture of the membranes, the cervix went into an unusually strong spasm which rapidly passed off. It is, of course, conceivable that I was mistaken (1) in the diagnosis that the os was fully dilated, made before rupture of the membranes; (2) in the diagnosis made after rupturing them that the os was only two-fifths. These possible errors can be eliminated (*a*) because the os was four-fifths at 8 A.M. and 10.15 A.M., (*b*) because of the particularly careful examination after finding that the os was two-fifths.

The spasm of the cervix may have been a neuro-muscular disorder due to a sleepless night, the patient being restless, weak-spirited, terrified, very fat and uncomfortably distended abdominally. But more remarkable than the sudden onset of the spasm is the rapidity, as acute as its onset, with which it must have subsided, with most humiliating sensations on the part of the obstetrician, who was not equal to the intellectual emergency and whose judgment must have seemed so wide of the mark. Was this rapid subsidence of the spasm of the cervix due, one wonders to the omnopon and connected with the patient's immature psychological status?

[5] Bailey, Hamilton: THE LANCET, 1929, i., 820.

Medical Societies.

MEDICO-LEGAL SOCIETY.

At a meeting of this Society held on June 27th, Sir William Willcox took the chair, and Dr. E. Temple Gray read a paper entitled

The Medico-Legal Expert in France.

The difference between the status of the *médecin légiste* and that of the medico-legal expert in England was, he said, essentially due to the wide difference in legal procedure between the two countries, and especially to the difference in the position of witnesses. Crime was investigated by the officials of the Parquet, which was a department of the office of the Ministère Publique, and was so-called because they sat at a table below the bench, on the floor of the court. It was possible for the prosecutor to find himself, later on, on the bench to try the case with the earlier stages of which he had been concerned. All the evidence was heard in the form of statements, which were not taken on oath, and were known as *procès verbaux*: no oral evidence was heard until the actual trial before the superior court. When the case opened before the Cour d'Assise, the clerk read over the charge, the Ministère Publique might open, and the witnesses answered their names and retired to a separate room. They gave evidence, but could not be interrupted; they made speeches. The object of this procedure was, in theory, that their evidence should be spontaneous. In practice, however, they had plenty of time to prepare it. A witness might change a statement which he had made before the Parquet, and the court might listen to hearsay. Journalists, politicians, and professors of philosophy were in special request as witnesses. Cross-examination, as understood in this country, was quite unknown. Witnesses for the defence were heard, and the defending counsel spoke last. There was no summing-up, but the questions for the jury were agreed by both sides or fixed by the court.

Whereas medical witnesses in England enjoyed the same privileges and disabilities as other witnesses, in France their position was laid down specially in the civil code. *Médicins légistes* were organised into panels, which were composed of specialists in various departments of medicine, who need not possess the Diploma of Legal Medicine. The panel also contained a large number of men who in this country would be police surgeons. Besides this peculiar status, the medical witness in France had another privilege: the civil code imposed on him a very stringent *secret professionel*. The medical man was the first person mentioned in this provision, which gave a schedule of professions whose members were forbidden to divulge confidences they had received in their professional capacity. A third factor contributing to the authority of the medical witness was the great importance which the court attached to the written reports of evidence, and the small part played by oral testimony. These *procès verbals* were not verbal, but survived from mediæval times, when the police and other officers of State were unable to write. French law defined a large number of functionaries who were allowed to make verbal reports, which were accepted without question in a court of law.

The medical expert was, for all practical purposes, called by the judge; he was named in much the same way as an English coroner named his autopsist. An

expert "committed" to make an inquiry signed a declaration before the *juge d'instruction* that he would report on faith and conscience, and on his report, upon which he would probably not be cross-examined, depended the technical evidence which would come before the court. He was invited to say whether responsibility attached to any person, and whether any action should be taken on the preliminary police inquiry. In a case of rape, for instance, he might be asked to describe the signs of the victim's resistance, and when insanity was pleaded in defence he would report on the responsibility of the accused. If two alienists decided that an accused person was not responsible, their report would be more or less conclusive.

The Medico-Legal Institute of Paris.

In 1903, the old Morgue had received the name of the Medico-Legal Institute, partly in deference to popular prejudice, and partly because the serious teaching of medical jurisprudence began there in that year. The present building, a splendidly equipped affair, had been opened in 1923. The bodies of all persons who died in Paris under circumstances requiring investigation—roughly 2000 every year—were sent to the Institute, which was also the centre for all medico-legal inquiries and examinations for workmen's compensation. The finances were rather complicated, as they were divided among three bodies; the first two would roughly correspond to the Home Office and the London County Council, and the third, the medical faculty, had no counterpart in London. The building was organised into two departments. The first, which was more or less deserted, contained what was ominously called the reception room; the autoclave, for disinfecting the clothes of the bodies; a large *vestière*, in which all bodies were classified; and spacious refrigerating cellars where they were stored. Refrigeration was performed by an ammonia plant which only needed to be worked for six hours a day. Bodies were kept at about 10 degrees of frost before examination and at freezing-point afterwards. This provision greatly assisted the autopsist. Small refrigerating safes were provided for viscera and fœtuses. There were also a waiting-room and chapel. The second, the busy part, held the headquarters of the medico-legal school and the departments of identification, pathology, and toxicology. It contained post-mortem rooms; pathological, toxicological, and research laboratories, a library, and a museum. The Dean of the School presided over the *Service d'Identification*, which did for the police much work not necessarily performed by teaching authorities in this country, consisting roughly of the identification of weapons, clothes, and other material. The scientific side of the institute was presided over by the municipal authorities, who had full control of the material. In contrast to the practice in England, an expert who was not on the teaching staff could not perform autopsies in this department, and the students therefore lost the advantages of his experience.

Dr. Temple Gray referred to the special committee of the Medico-Legal Society, which had been appointed some years before to consider and report on the possibility of founding a similar institute in this country, and suggested that it should resume its work.

Discussion.

Dr. LETITIA FAIRFIELD said that the committee of the Society had left the situation in an unsatisfactory position, but that the obstacles to the plan were not always realised by the public. The first difficulty was the position of the coroner in this country. The coroner's court was a magnificent institution, but it would be difficult for a medico-legal institute to collect all the material into one centre, and have it examined and dealt with by experts under the authority of the criminal court, without encroaching on the province of the coroner. The second difficulty was constituted by the very complicated organisation of the University of London. Edinburgh and Glasgow, in which medical instruction was centralised, possessed excellent medico-legal institutes. In London, however, the concentration of teaching material in one centre would immediately create difficulties with the many medical schools. The third difficulty lay in the very intricate relations between the London County Council and the coroners' courts in the various boroughs. The fact, however, remained that there was a great need for a medico-legal institute in this country, not only to concentrate the best teaching of medico-legal methods, but also to ensure that crime should be dealt with in the most scientific and up-to-date manner, which, whatever the public might think, was not the case at present. All these difficulties were simple questions of organisation, and could be overcome. The real trouble was that it was nobody's business to defray the initial cost. To create an institution similar to that of Paris would require a considerable capital sum, and none of the various bodies concerned—the Home Office, the London County Council, and the University of London—felt sufficiently interested to justify the expenditure. If some great philanthropic donor could be induced to realise the vital importance of this project to British medicine, the other obstacles would very soon be overcome. This country performed some of the finest medico-legal work in the world, but instruction in the subject was not organised, and encountered unique barriers. Dr. Fairfield hoped that the committee would spare no pains to produce a solution.

Dr. E. MACNAMARA asked whether the defence also was allowed, under French law, to call expert witnesses, whether they were subject to cross-examination, and what importance was attached to their evidence as opposed to that of the official experts.

Mr. E. R. BOLTON suggested that the scope of the medico-legal institute should include the work of the analyst, which was closely allied to that of the doctor but was very little studied from the legal aspect. He felt that cross-examination was a vital part of expert evidence, and produced the most valuable testimony.

Mr. E. HINKS agreed with Mr. Bolton on the importance of the chemical side of medico-legal work. He quoted the remark of a legal friend that, in practice, everybody concerned in an English criminal trial knew the criminal's record, and suggested that in reality the English procedure might therefore not differ greatly from the French, in which the prisoner's antecedents were made public at the opening of the case.

Mr. A. CREW declared, on the contrary, that the jury, who had to decide the facts, did not know the prisoner's record, and that if they ascertained it by accident the trial was generally held to be invalid. He remarked that in this country the medico-legal expert was usually regarded with suspicion—in many cases rightly so—and inquired how he was regarded in the public opinion of France.

Sir BERNARD SPILSBURY corroborated Dr. Fairfield's exposition of the difficulties in the way of founding a medico-legal institute in London. When the institute came into being—for he regarded its foundation only as a matter of time—a fresh difficulty would arise, that of planning a building and an organisation for a volume of work which was now very difficult to estimate, but which would certainly be three times as heavy as that of Paris. It was hard to see how a large enough expert staff was to be recruited. There would, however, be little difficulty in centralising inquests, for recent legislation had permitted the transfer of a body from a coroner's court to any suitable centre for investigation. It would be impossible to model an English institute upon any given continental one; the organisation would have to grow from small beginnings along lines dictated by conditions in this country. Any institute would be an improvement on the present unsatisfactory procedure, which kept medico-legal experts out of touch with workers in other branches of medicine. It was, however, useless to consider the question until the financial problem had been solved, as, apart

from the cost of foundation, the expenses of the institute would have to be defrayed for the first few years. It would be impracticable to house the institute in any existing building, such as a discarded poor-law infirmary, for its work could only be carried out in a building specially designed for the purpose. Until the general public appreciated the necessity for an institute, or some serious disaster occurred, it was unlikely that any Government would take up the matter.

The CHAIRMAN inquired whether, in Dr. Temple Gray's opinion, the accused in France had such a fair chance of receiving justice—or of being acquitted—in France as in England. Reports of *crimes passionels* suggested that many persons were acquitted who would certainly be convicted in this country. He doubted whether teachers of forensic medicine in London could find the time to travel to a central institute.

Dr. TEMPLE GRAY, in his reply, stated that the French prisoner received equal justice with the English. Getting justice and being acquitted were not the same thing. French juries were very lenient, and their sentiment tended to balance any bias which the procedure might give to the prosecution. The jury might send for the President of the Court to inquire what effect their recommendation to mercy would have on the judgment. In addition to the official experts, it was the custom to nominate others of a lower standing to check their work. These, although not officially called by the prisoner, substantially assisted in his defence. The judge might ask an expert to attend and explain his report—rather an ominous invitation. Given the right teacher, a medico-legal institute could be started in a shed; the first toxicological bureau in Paris was housed under thoroughly insanitary conditions in the old Morgue. The future London medico-legal institute should start from the same small beginnings. The French were one of the most economical people in the world, and if they could afford an institute this country could, but the project would not be realised by the provision of a large sum of money. The first step towards a solution was to consider the manner in which the various institutes of the world had overcome their difficulties. It was essential that the medical profession be corporately represented on the managing board. Medico-legal experts in France were, on the whole, estimated by public opinion at their individual value. Dr. Temple Gray ended by pleading that, when the proposed institute was founded, the Medico-Legal Society should take a fitting part.

ROYAL SOCIETY OF MEDICINE.

SECTION OF UROLOGY.

A MEETING of this Section on June 27th, with Mr. SWIFT JOLY in the chair, was devoted to cinematographic demonstrations of three operations—prostatectomy, litholapaxy, and urethrotomy—performed by Sir John Thomson-Walker. The last of these films was accompanied by a talking film, a clearly enunciated description being given as each step of the operation was undertaken. The meeting, a large one, showed high appreciation of the demonstration, and this was expressed in a few words by the PRESIDENT.—Mr. FRANK JEANS, Mr. F. E. FEILDEN, and Mr. F. M. LOUGHNANE commented on details, after which Sir JOHN THOMSON-WALKER expressed his thanks for the assistance he had received from Mr. C. P. G. Wakeley, to whom he was indebted for the idea, and from the staff of the Department of Urology, King's College Hospital. The spinal anæsthesia had been given by Mr. Cecil Hughes. He could not speak highly enough of the work of the Medical Department of the Kodak Company. They had provided conditions under which a student could sit and quietly watch operations much more easily than if he was present in a more or less crowded operating theatre. The sound reproduction was carried out by the His Master's Voice Company, and hearers would judge of its success; if there were faults, they were faults of the speaker, not of the reproducer. An important question was, what was the value of moving pictures from the educational standpoint? He thought the profession was on the threshold of a good deal of change in this respect. It was well known to be impossible to show every student every sort of case or every sort of operation, but this new method enabled him comfortably to see and study half a dozen in an afternoon. Thus, he was sure, the means at the disposal of the Universities and teaching hospitals would be supplemented—he did not say they would be entirely changed—by this combination of moving picture and sound reproduction.

Sir John Thomson-Walker was cordially thanked.

Reviews and Notices of Books.

BIBLIOTHECA OSLERIANA.

Collected, arranged, and annotated by Sir WILLIAM OSLER. London: Humphrey Milford, Oxford University Press. 1929. Pp. 786. 63*s*.

THIS is the catalogue of the books illustrating the history of medicine and science collected, arranged, and annotated by Sir William Osler, and bequeathed by him to McGill University, Montreal. It is a vast volume of 786 quarto pages and shows Osler's catholicity. In the bequest to McGill we see the design of the testator to make the library possess a definite educational purpose, and this it does and much more also with its assistance. The plan of the catalogue was foreshadowed in 1911 and the work occupied Osler's few leisure moments throughout the intervening period until his death in 1919. Its preparation helped in some measure to mitigate the anxiety which the war brought him, an anxiety so sadly justified in the event, and at the time of his death the general outline had been sketched. It has fallen to Mr. W. W. Francis, the librarian of the Osler Library, Mr. R. H. Hill of the Bodleian Library, and Mr. Archibald Mallock, librarian of the New York Academy of Medicine, to complete the task by issuing the catalogue, their work being made possible by the whole-hearted coöperation of Lady Osler, who regrettably did not see the work finished.

The object of the index as laid down by Osler was to enable the hard-pressed student to learn first the evolution of knowledge in any subject and, secondly, the life and work of the men who made the original contributions; the general idea thus was to present in a comparatively small number of works the essential literature centring about the men of the first rank, arranged in chronological order. The Bibliotheca Osleriana, comprising about 7600 bound volumes, is grouped into eight sections as follows: (1) Prima: the beginnings (early civilisations), the medicine of the Greeks and the Arabians, the science and medicine of the Middle Ages, and the science and medicine with its scientific foundations and alliances of the sixteenth century down to the present day. (2) Secunda: the works of men which have some special interest but which are not so important as those in the Prima. (3) Literaria: books dealing with the literary vocations and hobbies of medical men, with the relations of medicine and science to the world of letters, medical and philosophical poems, and "medicated" novels, or novels containing medical characters. (4) Historica and (5) Biographica: general histories of medicine and the stories of special medical

movements or institutions. (6) Bibliographica: includes a vast collection of important catalogues. (7) Incunabula: a collection of more than 100 works printed before 1500. (8) Manuscripts: a collection in many languages comprising nearly 300 specimens, and including some of the collector's own writings.

It will be gathered that we have here a work of reference of the highest value both to individual students with many different wants, to those who want to correct or revise or criticise, and to all librarians. The advantage of sectional arrangement for reference is made available by a full and careful index of some 80 pages. It is unfortunate that the introductions which Osler intended to write as headings to the sections were never written, for his explanation to students how the Bibliotheca Osleriana was to be used would assuredly have made delightful reading. How to obtain and to pursue a knowledge of the history of science and of medicine would have been the very theme for his bright, learned, and logical pen, while the essays would certainly have constituted a wonderful commentary upon his own life—the life of the untiring and loving student.

While the library here catalogued constitutes the bulk of the literature brought together by Osler with a definite educational purpose, his bequests to the Medical Faculty of McGill did not exhaust his collection, for to Johns Hopkins University in Baltimore he left a collection of works, chiefly modern, on the arteries, blood, and tuberculosis, while to the Tudor and Stuart Club, at the same University, he left a collection of important editions of English works in memory of his only son Edward Revere Osler, who was killed in the war.

RECENT ADVANCES IN OPHTHALMOLOGY.

Second edition. By W. STEWART DUKE-ELDER, F.R.C.S., Assistant Ophthalmic Surgeon, St. George's Hospital. London: J. and A. Churchill. 1929. With 4 coloured plates and 110 text figures. Pp. 405. 12*s.* 6*d.*

A SECOND edition of this work has been called for within 18 months of its original publication. The author has taken the opportunity to add new matter based on as many as 370 additional references and has still managed to keep the volume to a reasonable size. The new work on the eye here described can only be followed by those medical men whose knowledge is based on a fairly broad scientific foundation. In the first chapter the accounts of the structure of the atom and the nature of radiation take the reader at once into deep waters; in the last, a discussion of those aspects of Pavlov's experimental work which tend to prove that all cerebral action is reflex leaves him in a whirlpool. The new work detailed in the intermediate chapters is for the most part easier to grasp. The "chronaxie" of the retina—that is, its sensitiveness to electric stimulation of a certain duration—has been found to differ in different parts, the required duration being greater in the periphery than in the foveal region; this result is not surprising in view of the distribution of the rods and cones. In the chapter on embryology the important additions to our knowledge arising from the recent work of Miss Ida Mann have been incorporated.

From the clinical standpoint the chief interest of the book is found in Chapters IV., V., and VI. Chapter IV. is devoted to the newer methods of diagnosis—the slit lamp, ophthalmoscopy with red free light, and the examination of the angle of the anterior chamber by the gonioscope, and Chapter V. with the vascular circulation, the nature of the intra-ocular fluids, and the intra-ocular pressure. Much attention is devoted to the origin and nature of the vitreous. Its chemical composition is practically identical with that of the aqueous, with the addition of two constituents which, absorbing water and swelling up in solution, give rise to increased viscosity, elasticity, and a certain amount of solidity. A substance in this state is called by physicists a "gell"; it is structureless except to the ultramicroscope. In Chapter VI. the three diseases discussed are retinitis, glaucoma, and cataract. The problems connected with glaucoma do not appear to have advanced much nearer to a final solution. Mr. Duke-Elder appears to regard it as a disease in which increase of intra-ocular pressure is not necessarily the essential symptom. He says on p. 206:—

> "A series of cases like those reported by Pickard (1925), wherein a cupping of the disc resembling cavernous optic atrophy was accompanied by symptoms akin to glaucoma without detectable rise in the intra-ocular pressure, is difficult to explain on orthodox lines. Experimental evidence also seems to suggest that the formation and development of scotomata are not entirely dependent on pressure, but in some cases, at least, are due to changes in the fluid traffic of the retina; and clinically the progress of the symptoms does not run by any means parallel with the tension and frequently continues after its efficient relief."

This is hard doctrine for those who look upon glaucoma and raised intra-ocular tension as synonymous terms. We do not get much practical guidance with regard to non-operative methods of treating glaucoma. The action of adrenalin on the eye is to cause contraction of the arterioles, but to render the capillaries more permeable. An initial lowering of tension is followed by a slight rise. Hamburger's glaucosan, which tends to lower the tension but dilates the pupil, is only suitable for secondary glaucoma. In clinical work we have little justification for experimenting, since Mr. Duke-Elder finds both glaucosan and histamine unreliable drugs. The new method of intravenous injection of salt solution is mentioned, but only as a measure preliminary to operation. A chapter on general methods of treatment sets out the views of the author, founded on his own work at the Moorfields light clinic. In the final chapter on neurology, new matter concerning the pupillary paths and the oculo-motor system will be found. To the index of subjects an index of authors has now been added.

The activities of ophthalmologists seem to be extending rapidly just now, and Mr. Duke-Elder is keeping pace with them with great skill and judgment.

ELECTROTHERAPY.

The Principles of Electrotherapy and their Practical Application. Second edition. By W. J. TURRELL, M.A., D.M., B.Ch. Oxf., D.M.R.E. Cantab., Consulting Physician, Oxford County and City Mental Hospital; Physician in charge of the Physiotherapy Department, Radcliffe Infirmary, Oxford. London: Humphrey Milford, Oxford University Press. 1929. Pp. 413. 16*s.*

Dr. Turrell's book is based upon a large practical experience of the diseases and complaints which can be cured or alleviated by electrotherapy. It is divided into six parts. An interesting historical chapter is followed by one on the therapeutic action of current electricity. The chief forms of the electrical current used in medicine are here outlined. A nice discrimination is shown by the author in describing the responses of the individual to currents of high and of low frequency, and of the currents which can be derived from the static machine. The therapeutic action of radiant energy is then considered; Dr. Turrell himself makes great use of the tungsten arc in hospital practice. Electrical Accidents and Electro-Diagnosis are discussed, and finally the application and mode of action of electricity in certain diseased conditions are outlined. This section takes up nearly 150 pages and should be of service to those who, having acquired some knowledge of the mode of action of the various currents, seek to apply them to patients.

Dr. Turrell has a long record of clinical experience, and has turned it to account in the application of electrical currents to damaged tissues or pathological conditions of widely different types.

UROLOGICAL ROENTGENOLOGY.

By HUGH H. YOUNG, M.D., Clinical Professor of Urology, Johns Hopkins University; Director, James Buchanan Blade Urological Institute; and CHAS. A. WATERS, Instructor in Clinical Roentgenology, Johns Hopkins University; Assistant Visiting Roentgenologist, Johns Hopkins Hospital. New York: Paul B. Hoeber. Pp. 499. $20.

THIS monograph is No. 7 of a series issued in America under the title of the Annals of Roentgenology. It is produced primarily for the use of radiologists though it contains material worthy of close study by urologists. Its main value lies in 518 figures, the majority being reproductions of actual radiograms of various conditions of urological interest. Taken for the most part from the service of the Blade Urological Institute and the Johns Hopkins University, these reflect the magnitude of the clinical area served by this institute and the ability of its director to make full use of the copious material. The radiograms—many of which are pyelograms, cystograms, and vesiculograms—cover every imaginable urinary condition and form a valuable collection for reference. Case-histories give a clue to the interpretation of the figures, though special points illustrated by individual radiograms should in some places have been more precisely indicated. Where radiograms are not supplied the text, which except in the first chapter is slender, is elucidated by beautiful drawings by Mr. Wm. P. Didusch. This first chapter, entitled Combined Roentgenological and Urological Study, is rigidly confined to the discussion of these aspects of technique which are common ground to both specialties—opaque media, the position of the patient for pyelography, perirenal insufflation, and so forth. Elsewhere the text consists of urological smatterings which are not sufficiently recondite to be valuable to the urologist and are of questionable importance from the radiologist's point of view. The authors have supplied them deliberately, however, holding that an intimate knowledge of the problem at issue on the part of the radiologist is essential to the success of the combined effort to solve it.

The book is beautifully though expensively produced. It represents faithfully the present stage in development of a youthful subject whose growth has been rapid and promises to continue so. The object of Dr. J. T. Case, the editor of the series, to supply a diagnostic guide rich in the fruit of experience of leading authorities in special fields has certainly been achieved in this volume.

PHYSICAL DIAGNOSIS.

Second edition. By CHARLES PHILLIPS EMERSON, A.B., M.D., Professor of Medicine, Indiana University School of Medicine. London: J. B. Lippincott Company. 1929. Pp. 553. 35*s*.

THIS book has been written because of the author's belief in the profound importance in medicine of the examination of the patient's body through the use of the unaided special senses, and his conviction that this will remain the primary and fundamental method of diagnosis. It is a rare change to have before us a book on diagnosis in which the use of microscopes or test-tubes is neither mentioned nor inferred. In the elucidation of disease, however, there can be no real subdivision, and a book rigidly confined to physical diagnosis is necessarily incomplete. In a work of over 500 pages on diagnosis in medicine we have a right to expect some material help in connextion with all the common medical states, but are occasionally disappointed in this one. For example, a search through the book for information on pernicious anæmia reveals only three references to this malady—the condition of the tongue, the colour of the skin, and the occasional enlargement of the spleen—the description of the blood being outside the scope of the work. If we accept these limitations as imposed on the author by his title, we can enjoy the pleasant writing and excellent balance of the sections allotted to each disease. The first chapter opens with an interesting historical sketch of the great masters in medical diagnosis, while the second deals with general body characteristics, types and attitudes in disease. The pages devoted to the general body surface contains a comprehensive account of the various skin conditions. The physical signs of the chest are accurately described and assessed with the mature pen judgment of an expert. References to recent contributions to literature are almost entirely confined to American publications. The photographs, the work of the Indiana University Department of Illustrations, are worthy of high praise.

OUTLINES OF DENTAL SCIENCE.

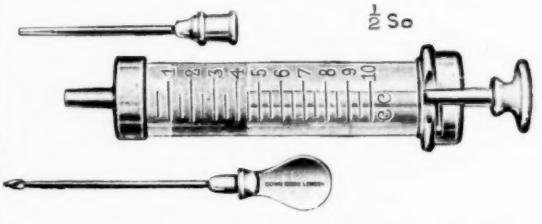
Dental Histology. By A. LIVINGSTON, M.D.S., M.B., Ch.B., L.D.S., Director of Dental Studies and Sub-Dean, King's College Hospital Dental School. Edinburgh: E. and S. Livingstone. 1929. Pp. 143. 7*s*. 6*d*.

THIS volume, which is one of a series of small books intended to cover the whole field of dentistry, is devoted to the histology of the dental tissues. It is clearly written and within the compass of 147 pages manages to convey a considerable amount of information. For revision purposes the student may find it useful, though used by itself it is scarcely full enough to satisfy examination requirements. The last chapter is devoted to microscopical methods and might with advantage have been more detailed. Should further editions be called for we would suggest that the meagre chapters on the structure of the tongue, oral mucosa, salivary and lymphatic glands might well be deleted and replaced by a more comprehensive description of histological methods with some account of the optical principles of the microscope. The illustrations are not numerous enough to be of real use.

New Inventions.

AN IMPROVED TROCAR AND CANNULA.

IN the aspiration of small abscesses, particularly in children, it is important to be able to carry this out as expeditiously as possible and with the minimum amount of inconvenience to the patient. The following are the outstanding points in the trocar and cannula here illustrated. (1) Comparatively short distance



between point of trocar and end of cannula. (2) Close fitting of end of cannula to trocar, which is narrowed for the purpose, thus enabling the cannula to slip easily into the opening made in the skin. (3) Convenient length and bore of cannula. The trocar is 2 in. long, No. 6 French catheter gauge, and is used with a 10 c.cm. metal and glass syringe.

The apparatus has been made for me by Messrs. Down Bros., Ltd., St. Thomas's-street, London, S.E.

GEORGE JESSEL, M.D. Oxf., D.P.H. Manch.

THE LANCET.

LONDON: SATURDAY, JULY 6, 1929.

PROBLEMS OF EPILEPSY.

THERE are at least two recognisable types of unsolved problem, the simple and the complex. In a simple, which is not synonymous with an easy, problem the task before the investigator is a well-defined one, for example the extraction of the active principle of a gland or the isolation of the infective agent responsible for a disease. The discoveries that rewarded the patience of EHRLICH, ROSS, and BANTING were solutions of such well-defined problems. On the other hand, there are diseases which at present defy explanation by their very complexity, and the two outstanding examples of these are cancer and epilepsy. The investigator of these baffling problems has no determined starting-point. Like a wanderer in a maze he is compelled to take one turning after another, following the path to which personal predilection invites him without any guarantee that it leads in the right direction, or even that it is not a blind alley. It is characteristic of our state of ignorance that the very use of the term "epilepsy" should be of problematic value. Many writers refuse to employ it except for a symptom evoked by a number of pathological states, and they speak therefore of the "epilepsies."

Good will come from an emphasis upon the variety of lesions of which a convulsion may be evidence. But the existence of comparatively gross causes for epilepsy in some cases does not justify the assumption that such are its only causes. Actually there is evidence for the existence of a constitutional ætiological factor even sometimes when a focal lesion is also present. The oft-quoted incidence of epilepsy in about 5 per cent. of cases of gunshot wound of the head in the late war, and the constancy of this rate in all combatant countries, appear to point to a predisposition to convulsions latent in these individuals; there seems no other adequate explanation for the fact that a family history of epilepsy is obtainable from some 30 per cent. of epileptics and is not uncommonly present in patients with an organic "cause" for their convulsions, such as a head injury. If a "constitutional" basis exists in at least a proportion of epileptics it is natural to inquire whether the epileptic habitus is one of its manifestations. The practitioner with experience of epileptics soon learns to recognise that they often exhibit a characteristic facies, apart, of course, from such accidents as scars and a bromide rash. So typical is the appearance of many epileptics that it is often possible to make a correct diagnosis at sight before the history has been given. We have at present no means of deciding whether the epileptic facies is the result of the fits or the expression of an underlying diathesis. Equally uncertain is the relationship between mental deterioration and epilepsy. It was at one time believed that the mental degeneration of the epileptic was largely, if not entirely, the result of the large quantities of sedative and depressant drugs which fell to his lot. This is almost certainly untrue, for the mental condition of most epileptics is improved by anti-convulsant drugs, and it is a striking fact that they do not as a rule experience the depressant effects of bromide and luminal to the same extent as normal persons. Sedatives appear to fulfil a physiological need in epileptics. It does not seem, however, that any direct relationship exists between convulsions and mental deterioration, for every clinician is familiar with epileptics who deteriorate little if at all in spite of frequent fits, while others, perhaps less frequently and less severely convulsed, nevertheless become progressively demented. Is the mental deterioration of the epileptic possibly also an expression of a constitutional defect, of which degeneracy and convulsions are independently variable manifestations?

The conception of an epileptic diathesis involves the view that there exist potential epileptics who lack the precipitating factor, the trigger which fires the charge. Such must have been the previous condition, on this hypothesis, of the 5 per cent. of wounded who only became epileptic following their injuries. The hypothesis of a constitutional abnormality underlying some forms of epilepsy is the incentive, implicit if not explicit, of most metabolic investigations into epilepsy. If epileptics possess no common metabolic abnormality such researches are doomed from the outset to disappointment. Such has indeed been the outcome of many painstaking labours in the past. A long list might be made of metabolic functions in epileptics which have been conclusively shown to be normal. Even reported abnormalities have hitherto found no general acceptance. Other observers have failed to confirm the alkalosis reported by BIGWOOD, or the "ammonia dysregulation" upon which BISGAARD and NORVIG lay stress. It is, however, possible that a new and interesting chapter has been opened by the recent researches into the behaviour of the blood cholesterol in epilepsy. DE CRINIS and PEZZALI first observed abnormalities in the blood cholesterol level in epileptics, and POPÉA and VICOL drew attention to the association of a low blood cholesterol and disappearance of the lipoid of the suprarenal cortex in status epilepticus. ROBINSON, BRAIN, and KAY reported in our own columns[1] that the average blood cholesterol was lower in epileptics than in controls, and described 11 series of determinations, 10 of which showed a fall in the blood cholesterol level preceding a fit. We publish this week a communication reporting a further investigation of this question by Dr. GOSDEN, Dr. TYLOR FOX, and Dr. RUSSELL BRAIN. Using the method of serial determinations of the blood cholesterol at frequent intervals, these workers have confirmed the observations of ROBINSON, BRAIN, and KAY and demonstrated not only a depression of the blood cholesterol level during status and serial epilepsy, but its instability in association with isolated fits, and in four further instances a fall preceding an attack. Dr. GOSDEN, Dr. FOX, and Dr. BRAIN do not commit themselves to any theoretical explanation of these phenomena and are careful not to attribute any causative relationships between disturbances in the blood cholesterol level and the occurrence of convulsions. We know so little at present concerning the metabolism of cholesterol that these observations cannot be said to throw any direct light upon the cause of epilepsy. They do, however, appear to indicate the existence of a metabolic abnormality in epileptics and to suggest lines of research.

A definite fact concerning cholesterol which has long been familiar is its intimate relationship with the liver. It is secreted in the bile, being presumably

[1] THE LANCET, 1927, ii., 325.

removed by the liver from the blood stream. These observations upon the blood cholesterol in epilepsy therefore assume an added significance in the light of the investigation of the lævulose tolerance test in epileptics reported by Dr. GOSDEN and Dr. TYLOR FOX in this journal last week. These workers have as yet only a small number of observations to record, but they are of unusual interest. In several severe cases of epilepsy the lævulose tolerance tests yielded results hitherto associated with extensive destructive lesions of the liver. Less severe cases showed an impairment of lævulose tolerance of less degree. It is to be hoped that further investigations will be made on these lines. It is common experience that considerable destruction of the liver may take place without any detectable abnormality in the lævulose tolerance test. The findings of Dr. GOSDEN and Dr. FOX point therefore to a functional liver deficiency of extreme severity occurring in epileptics, though there is nothing in their observations to indicate the physiological relationship of this disturbance to the attacks. A number of years ago MYERSON observed in a small series of autopsies upon epileptics that the weight of the liver was subnormal in a large proportion of cases. This observation has since been confirmed by THOM, and more recently by PATTERSON and WEINGROW. Here there are hints, both anatomical and physiological, that constitutional abnormalities may be present in epileptics, and there are sufficient indications to encourage energetic research into their hepatic functions. Those who regard epilepsy as merely a symptom must admit that if they are right there is little hope of alleviating the complaint on a large scale. Those who seek an epileptic diathesis may encourage themselves with the knowledge that, if such could be discovered, an important advance would have been made towards a cure.

It is one of the fascinations of epilepsy as a subject of research that it presents so many aspects which, though necessarily related, are nevertheless to a large extent capable of independent consideration. It is not improbable that a metabolic abnormality might be discovered and relieved in epilepsy without its convulsant effects being understood, a situation similar to that which has arisen in the treatment of pernicious anæmia. Hence there is unlimited scope for those whose interest leads them to seek the physiological nature of a convulsion or the precipitating factors which lead to the onset of a fit. The belief that cerebral vasoconstriction plays such a rôle has long been held, though perhaps never on grounds which could entirely withstand criticism. The relationship between the concomitant vasomotor changes and the attack well illustrates the complexity of the problems of epilepsy. Blanching of the cerebral cortex at the beginning of a fit has been observed on several occasions by surgeons, but at the time when stress was laid upon this observation it was not fully understood how profoundly the opening of the skull alters the normal conditions of cerebral circulation. Moreover, even if cerebral vasoconstriction does occur at the beginning of a fit, parallel to the generalised cutaneous pallor, this is far from a proof that it causes the attack. Such vasomotor changes may merely indicate the participation of the sympathetic nervous system in the neural discharge which constitutes the fit. However, even if the vasomotor origin of the convulsion should prove to be mistaken, it will have shown once again the value of error, for this theory has led to the illuminating researches of COBB and FORBES which have gone far to establish the existence of vasomotor nerves to the cerebral blood-vessels. Those who look elsewhere than in the circulatory system for the genesis of the fit will probably expect to find it in a disordered metabolic state of the cerebral neurones, which expresses itself in a tendency to an uncontrolled discharge of energy. Here we reach the obscure realms of excitation and inhibition which neurology is now only beginning to explore. Already, however, we can recognise possible relationships between sleep, trance, narcolepsy, catalepsy, and epilepsy. The long familiar influence of waking and sleeping upon epileptic fits has recently been analysed in this journal by Dr. MARY LANGDON-DOWN and Dr BRAIN, who have demonstrated that some epileptics react to sleep in a manner diametrically opposite to others, and suggest that this difference may lie in their response to the inhibitory influence which in PAVLOV's view is the essential nature of sleep. From such considerations, at present necessarily speculative, it is but a step to the excitations and inhibitions which find expression in thought, feeling, and action, the influence of which upon epileptics is as profound as any metabolic or physiological changes. When fear may precipitate a fit and interest or effort avert one it is clear that psychology may have light to throw upon the nature of epilepsy.

In conclusion two facts may justifiably be emphasised. There was never less cause for pessimism as to the outcome of research upon epilepsy. But there was never a subject of research which so much necessitated a broad outlook in its investigation, and the closest possible collaboration between the biochemist, the physiologist, and the clinician.

COSMETIC SURGERY.

AWHILE ago we published a lively account of the award of 200,000 francs damages against an eminent Paris surgeon in a French court of law.[1] A patient, contemplating matrimony, was concerned as to the lack of symmetry of her legs. She consulted a surgeon who consented to perform an operation, reducing the right leg; owing, however, to difficulties of circulation, gangrene supervened and amputation became necessary. This substantial award of damages being regarded as a serious threat to certain aspects of French surgery, Dr. DARTIGUES, a past president both of the Société des Chirurgiens de Paris and of the Société des Médecins de Paris, brought the matter before the General Council of the Association Générale des Médecins de France in a vigorous protest. From this address it seems that the judge took the view that this particular operation was not necessitated by therapeutic considerations, that French law is not prepared to recognise certain operations of a merely "facultative" nature, and that the patient was deemed to be so strongly obsessed by her physical deformity that she was incapable of forming an independent judgment, or giving a legal consent to the operation which was, in fact, performed.

Without more exact knowledge of the grounds of the judicial decision (which, moreover, may be subject to appeal), it is difficult to comment on it. In England it would presumably be a mere issue of negligence. Cosmetic surgery has not yet occupied our judges' time, though they are familiar with claims for damages when dermatitis is alleged to have supervened after the application of hair-dyes. A woman's desire to look her best, and the disadvantage which age or disfigurement impose upon her matrimonial chances, are matters of which English judges and juries would undoubtedly take notice. In breach

[1] THE LANCET, March 16th, p. 576.

of promise actions juries are invited to assess the damage caused to a woman through the default of a fiancé to whom she was engaged during several years of her most marriageable age. In cases arising out of traffic accidents, injuries such as facial scars would similarly be regarded as a particular reason for liberality of compensation, and, if some physical disability were caused which modern surgery could ameliorate or remove, the cost of such further operation would no doubt be put forward as special damage due to the original accident. The criminal aspects of cosmetic surgery are even more speculative. As the law recognises the profession of surgery, it must admit the right of the patient to consent to the infliction of any bodily injury in the nature of a surgical operation, though such consent does not discharge the surgeon from the usual duty to exercise due care. STEPHEN, in his Digest of the Criminal Law, says further, that everyone has a right to consent to the infliction upon himself of bodily harm not amounting to maiming. He goes on to say that no one has a right to consent to the infliction upon himself of death, or of an injury likely to cause death, or of bodily harm amounting to maiming, *for any purpose injurious to the public*. He explains that he inserts the italicised words because it would be absurd to say that, if a dentist pulls out a patient's front tooth on the ground that the tooth, though not diseased, is unsightly, the patient and the dentist both commit a misdemeanour. For a clearer view of the English law we must wait till some definite case of the kind comes before the courts.

Dr. DARTIGUES, in his address, asked what was the proper sphere of "plastic" and "æsthetic" surgery, the epithets being in his opinion synonymous. Nobody doubts the propriety of using surgery as a corrective of congenital malformation or variation from the normal human type. It is equally applicable to remedy injuries due to accident or, as the last fifteen years have shown, injuries due to war. Coming down to the removal of facial lines or wrinkles and similar supposed blemishes upon feminine beauty, Dr. DARTIGUES has no hesitation in offering the resources of surgery here also. Æsthetic surgery in his definition is the sum of all operations of a plastic character intended to remedy natural or acquired defects in the human morphology which prejudice the personal and social value of the individual. He would agree, no doubt, that it is for the surgeon and not the patient to decide upon the propriety of the operation. If the beauty parlour movement develops a type of unqualified practitioner who, for a large fee, will exploit some fashionable operation for the mere removal of fancied blemishes, the law could hardly ignore the adverse consequences of risks thus run. Not long ago Prof. ARCHIBALD YOUNG, writing in our columns on the injection treatment of varicose veins, stated that he had several times been asked by quite young girls to apply the treatment to some odd superficial vein which caused no trouble whatever. Operation for mere beautification may be among the things which are lawful and yet not necessarily among those which are expedient.

DIPHTHERIA PROPHYLACTIC.

SINCE active immunisation against diphtheria became an everyday practice much attention has been devoted by laboratory workers to the subject of the antigen. In America this was originally an underneutralised mixture of toxin-antitoxin which was later replaced by a mixture in which the slight excess of toxin was further reduced, and the latter until quite recently has been extensively employed throughout the United States. Certain objections have, however, been raised from time to time to toxin-antitoxin mixtures and in this country they were superseded several years ago by toxoid-antitoxin. Toxoid, described by G. RAMON in 1923 and named "anatoxine" by him, is a modification of diphtheria toxin brought about by the addition of formaldehyde and exposure to a temperature of 38° to 40° C. for from four to six weeks. The process deprives the toxin of its toxicity but leaves the preparation in possession of well-marked antigenic properties, and it is in general use in serum laboratories for the preparation of diphtheria antitoxin. In this country toxoid alone has never replaced toxoid-antitoxin for immunisation of humans, although the procedures involved in its manufacture in the laboratory are simpler. As well as being a very efficient immunising agent, it has the further advantage that, since it contains no antitoxin fraction, immunised individuals are not sensitised to horse serum, a factor of some importance in these days when serotherapy is so widely employed for various conditions. It has, however, been given an extensive trial in France and Canada and now[1] we are indebted to Drs. GEORGE and GLADYS DICK for information on the comparative values of the immunity induced by toxin-antitoxin mixture and toxoid.

Two groups of susceptible individuals each numbering 100, mostly student nurses, have been immunised with each type of prophylactic to the point of being Schick negative. In the toxin-antitoxin group a preliminary injection of 0·5 c.cm. followed by four injections of 1 c.cm. at weekly intervals was given, whilst an interval of three months or longer was allowed to elapse before the reapplication of the Schick test. The toxoid group received three doses of 0·5, 1·0, and 1·5 c.cm., a two weekly period intervening between the injections, and retests were made not sooner than six weeks after immunisation was completed. It was found that in the toxoid group 94 per cent. of the total number, and excluding children 93·3 per cent., gave a negative Schick test, whilst in the toxin-antitoxin group 82 per cent. became negative reactors. Thus it appears that toxoid is a better immunising agent than toxin-antitoxin. The incidence of reactions has been carefully noted in the toxoid group, when 31·9 per cent. showed small local reactions, 9 per cent. large local reactions, 28·5 per cent. slight general reactions, and 6·3 per cent. moderate to severe local reactions. These observations are of considerable value, for the reason that toxoid has made little headway in this country, in spite of the advantages noted above, is probably because one or two workers have reported severe reactions following its use. The suggestion has been made that the reactions are the result of sensitiveness to some product of bacterial metabolism in the antigen, whilst others are of the opinion that the sensitiveness is towards some protein constituent of the medium in which the organism was originally grown. The Drs. DICK show, by an analysis of the nine severe general reactions represented by the 6·3 per cent. mentioned above, that when the original Schick test was performed five were marked and one was a moderate pseudo-reactor, whilst two had previous attacks of diphtheria. Whatever the real explanation of these reactions, the practical point that emerges is that they can be avoided or mitigated by commencing the immunisation of pseudo-reactors or persons in whom diphtheria has formerly occurred with small doses such as 0·1 or 0·25 c.cm. In view of

[1] Jour. Amer. Med. Assoc., June 8th, 1929.

data such as this it seems unlikely that toxin-antitoxin mixtures will survive very long, and we believe their disappearance would be greeted with a certain sense of relief by most immunologists.

The only serious rival that toxoid and toxoid-antitoxin have in prophylaxis is the toxoid-antitoxin floccule with which preliminary work is being carried out in this country and which on the basis of animal experimentation promises well. The ideal prophylactic that the clinician hopes to see evolved is a substance that will produce a high degree of immunity without unpleasant effects in one injection, but at the moment this is not in sight. We think, however, that in the meantime some attention ought to be paid to the spacing of injections as an improvement in results can be obtained by allowing intervals of three or four weeks between injections instead of weekly periods as originally recommended. Apparently the important factor to secure is the basal immunity following the preliminary injections. Once that has been established the succeeding injections stimulate the rapid formation of antibody.

Annotations.

"Ne quid nimis."

THE CAMPAIGN AGAINST RHEUMATISM.

SOME further developments of the scheme for founding a National Association for Combating Rheumatism, which we welcomed last November, were confirmed at a meeting, reported in another column.. The Executive Committee, elected last year, consisted of Sir Thomas Horder, Sir William Willcox, Dr. Fortescue Fox, Dr. E. I. Spriggs, Dr. C. W. Buckley, Dr. Kerr Pringle, Dr. Vincent Coates, Dr. L. J. Llewellyn, Mr. W. A. Cochrane, Dr. G. C. Anderson, Mr. W. A. Appleton, Mr. Henry Lesser, Mr. C. G. Izard, Dr. J. Alison Glover, and Dr. M. B. Ray (hon. secretary). They were charged to draw up recommendations for the general policy of the Campaign and to draft a constitution, and their suggestions were accepted at the meeting last week. The general direction and management of the Campaign is to be undertaken by a Council to which more than 70 individuals, including representatives of the various bodies were immediately elected, subject to their consent to serve. The Council so constituted has the power of coöpting additional members and to appoint executive, finance, medical, industrial, and general purposes committees from among its members. It is doubtless advisable to build up a National Association on the broadest possible basis, since help is needed from all branches of the medical sciences, from industrial leaders and from responsible public workers in many spheres. Unfortunately an edifice erected on such a scale must be of slow growth and it is permissible to hope that the desire to include everybody concerned with rheumatism in any form will not be allowed to cumber the new movement with too many administrators. In a national crusade against rheumatism the first requisite is research into causation. There are many forms of treatment which are recognised as partially successful and many other forms which have adherents. Under the plethora of treatment first principles tend to become submerged; research can only be organised on lines clearly defined. There is at any rate no lack of material and we hope that clinicians all over the country will submit to a levy on their capital of experience and permit the Association to tabulate and define exactly what is already known in the matter of statistics, ætiology, pathology, and prognosis. After this has been done the Association will be able to announce the precise directions along which advance is to be attempted, and to allocate definite tasks to its divisions and branches. In research much more than enthusiastic service is needed. Every worker for the Association should be able to help in the assurance that his efforts are designed to enrich the Association and not encumber it.

The international character of the problem is thrown into prominence by a book which we have just received entitled "Rheumaprobleme."[1] This is a report of a meeting held last October at Aix-la-Chapelle (Aachen), corresponding to the Bath Conference on Rheumatic Diseases earlier in the year. The gathering was a medical conference on research into rheumatism and most of the leading physicians of the spas of the Rhineland attended. Twelve independent contributions by acknowledged leaders on the various aspects of rheumatism are here published. The subjects include myalgia, serological studies, pathological anatomy, and histology. A discussion by Dr. Walter Krebs on physical and drug therapy shows how little agreement has yet been reached on the relative value of different methods of treatment. The schemes for investigation advised by our new National Association will be eagerly awaited abroad as well as at home.

OPERATION FOR GOITRE.

Dr. F. H. Lahey[2] has recently published his deductions from the study of 6700 operations for goitre—a mass of clinical material so large that it cannot fail to interest those whose opinions are based on comparatively few cases. Dealing first with the incidence of malignancy in goitre, he emphasises the liability of discrete fœtal adenomata to malignant degeneration and recommends their early removal. The clinical criteria of malignancy are not yet clear, but he thinks that all tissues showing vessel ingrowth, as first described by Allen Graham,[3] must be regarded as potentially malignant. In a series of 1484 cases of adenomatous goitre, 6 per cent. gave this evidence of malignancy on microscopic examination. Tumours of the thyroid gland often alter the position of the trachea, and if this valuable sign is present a radiogram should always be taken to exclude or confirm the presence of intrathoracic goitre. In a series of 4000 toxic goitres, the value of preliminary treatment with iodine has been amply confirmed. Preliminary pole ligations were rendered unnecessary and the mortality of exophthalmic goitre was much reduced. Lugol's solution was employed with advantage, not only in exophthalmic goitre but also in toxic adenoma, although its effects were less in the latter condition. Lahey advocates early operation for toxic adenoma before intense toxicity has supervened. To get its maximal effect in these cases iodine should be given for the first time shortly before operation. Long-continued iodine medication is bad from the point of view of operation later, so that where possible the decision between surgery and medicine should be made early. Patients with increasing thyroid toxicity are always in danger of passing into a severe thyroid crisis and any coexisting infection such as acute tonsillitis or influenza makes this risk greater. Subtotal thyroidectomy in the thyro-cardiac subject with heart failure evidently gives very good results. Only three deaths occurred among 200 cases in which hyperthyroidism was associated with failure of compensation, and patients for whom operation seemed a hopeless risk withstood partial thyroidectomy and recovered in a remarkable way. Lahey, indeed, holds that operation can be done in almost every case in which failure of compensation is due to a superimposed hyperthyroidism. When hyperthyroidism complicates diabetes mellitus or pulmonary tuberculosis, subtotal thyroidectomy may be very useful in controlling the associated conditions and should be done early. After operation for hyperthyroidism patients should always have their

[1] Published at Leipzig by Georg Thieme. 1929. Pp. 181. M.12.
[2] New England Jour. Med., 1929, cc., 909.
[3] Surg., Gyn., and Obst., 1924, xxxix., 781.

basal metabolism estimated at intervals of three months over a period of a year.

The results in 1000 consecutive cases of exophthalmic goitre and 245 of toxic adenoma showed that the average basal metabolic rate was within the limits of normal after three months and remained so while they were under observation. Parathyroid tetany only occurred in three cases in the whole series of 6700. This is attributed partly to careful surgical technique and partly to the fact that at the time of removal all thyroid specimens were carefully examined for possible parathyroid bodies. If these bodies were found and the finding was confirmed microscopically they were at once grafted into the belly of the left sterno-mastoid muscle. That this technique produced a living graft was confirmed experimentally on dogs by R. B. Cattell and R. L. Mason. The series contains no case of permanent bilateral abductor paralysis of the vocal cords, though unilateral lesions were occasionally met with. Lahey recommends that examination for unilateral paralysis should always be done before operation, so that if it is present elaborate precautions can be taken not to injure the remaining nerve. In this way some of the rare but desperate cases of bilateral nerve injury may be avoided.

A QUESTIONAIRE ON INSULIN

THE editor of the *Vie Médicale* has published in the issue of May 25th (p. 515) the answers of 11 professors and doctors to the following question: "What are the contra-indications, absolute and relative, to the use of insulin in proven cases of diabetes mellitus"? Opinion was unanimous that insulin was of great value; no one claimed that any preparation was effective when given by mouth, though one remarked that protein shock was of real assistance. The inconveniences mentioned as attending the use of insulin were chiefly the necessity of daily injections and the occasional lesions at the site of the puncture, which varied from a local swelling to a local fat atrophy. A minor trouble was the occurrence of hæmaturia, but this was regarded as rare, and even if it did occur was of no significance. The danger of giving insulin to patients with renal disease was stressed by a few, on account of the risk of hypoglycæmia making its appearance unexpectedly. The development of tuberculosis of the lung was mentioned as a complication, but on the other hand it was reported that patients with tubercle and diabetes made good recoveries. A review of the replies shows that the only point on which there is general agreement is the danger of hypoglycæmia in patients with cardiac complications; if the patient is already suffering from cardiac failure the œdema may be considerably increased. Hypoglycæmia was thought to increase the chance of an attack of angina pectoris, and might cause the onset of a paroxysm of auricular fibrillation; hence the need of avoiding hypoglycæmia, if possible, by stricter supervision in these cases.

EFFECTIVE THORACOPLASTY.

THE extent of collapse obtained by the operation of paravertebral extrapleural thoracoplasty is not constant, and sometimes its incompleteness interferes with successful arrest of the disease. The amount of rib resected is an important factor, as is also its removal right up to the transverse process. Yet these factors are not the only ones influencing collapse. The character of the lung, the presence of dense fibrosis, or of thick-walled cavities are equally important, and not infrequently, especially in the latter condition, a further operation such as apicolysis may be necessary. It is to overcome such difficulties that various alternatives have been tried. Gustave Piotet and Eugène Urech have recently described heir experience[1] with Roux's technique. In this operation the incision starts just below the spine of the scapula and is continued down to the tenth rib, along which it is carried. A subperiosteal resection of the eleventh to the fifth rib is made in the usual manner, some 15 to 24 centimetres of rib being removed. The upper four ribs are resected by an entirely different technique. They are denuded of periosteum and resected in order from below upwards, but access is obtained to each from below and from their deep aspect after stripping the parietal pleura and performing apicolysis. The authors' claim that the resulting collapse is more complete is supported by illustrative radiograms. The operation is done under local anæsthesia and preferably in one stage. If this is impracticable, the fourth to the eleventh ribs inclusive are resected at the first stage, and at the second, not less than 15 days later, access is obtained to the upper three ribs by an incision parallel with and through the fibres of the trapezius, or parallel to and below the clavicle. The two-stage operation differs very little therefore from the ordinary thoracoplasty, save in the method of access to the upper ribs. The authors recommend a preliminary phrenic evulsion. Their results with this operation were published two years ago.[2] Of 31 cases, 4 died shortly after the operation, 7 were lost sight of, and 18 had survived from 1 to 7 years. Of the latter, 2 were cured, 11 considerably improved, and 4 gained some benefit.

[1] Schweizerische Medizinische Wochenschrift, 1929,

AN INVESTIGATION OF PSYCHO-ANALYSIS.

THE Committee[3] appointed in 1926 by the Council of the British Medical Association to "investigate the subject of psycho-analysis" has produced a report[4] which is not the less interesting for being inconclusive on the main points at issue. "From the nature of the case," runs the final conclusion, "the Committee has had no opportunity of testing psycho-analysis as a therapeutic method. It is, therefore, not in a position to express any collective opinion either in favour of the practice or in opposition to it. The claims of its advocates and the criticisms of those who oppose it must, as in other disputed issues, be tested by time, by experience, and by discussion." Yet, though the "discussion" of the Committee has not enabled its members to make any general pronouncement on the subject, one point of great practical importance is decided. They agree that, though the word "psycho-analysis" is used in a "loose popular sense hardly capable of description or definition," in a strict sense it should only be used for the methods and theories of the Freudian school. "In any scientific enquiry into the matter," they say, "the claims of Freud and his followers to the use and definition of the term are just and must be respected." Consequently the serious discussion of psychotherapy is confined to the methods of Freud's school; those of the rival schools of Adler, Jung, Stekel, and others, are discussed in a short section on Other Analytical Methods, and the remarks of the Committee on Psycho-Analysis are not intended to apply to them.

This recognition—that the methods and theories of the Freudians have the exclusive right to the name "psycho-analysis"—is of more than verbal importance. For the report virtually concedes the claim of Freud and his followers, as represented by the International Psycho-Analytical Association, to be considered as a distinct and important school of psychotherapy and their right to be judged entirely independently of their rivals or imitators. Clearly the members of the Committee agree that, whether or not psycho-analytical theories and methods are valid, Freud's priority in the field and the authority and professional organisation of his school gives

[2] Rev. Méd. de la Suisse Romande, 1927, xlvii., 239.

[3] The Committee consisted of 19 members (of whom two retired and were replaced) with Dr. R. Langdon-Down (chairman), Dr. C. Worster-Drought (vice-chairman), and Dr. R. G. Gordon (hon. sec.).

[4] Brit. Med. Jour., June 29th, 1929; Suppl. pp. 262–70.

to psycho-analysis (in the strict sense) a weight to which no other system of mental analysis is prima facie entitled. Psycho-analysis, both as a theory of psychology and as a therapeutic technique (the word covers both senses), deserves to be treated with the greatest respect. And though the Committee are non-committal about the most important issues, they pronounce quite definitely on some of the criticisms to which psycho-analysis has been subjected. They reply to the suggestion that "psycho-analysis applied as medical treatment may cause insanity in the patient" with the categorical "No proof of this charge has been discovered by the Committee." They refute the suggestions that psycho-analysis ignores the relation of the body to the mind, that it is materialistic and that it is inordinately expensive. They are satisfied that it is impossible to make a verbal record of an actual psycho-analysis in order to present it to a sceptical public. On all these points the contentions of the psycho-analysts are upheld.

The summary of "modern psycho-analytical methods and teaching," which the Committee "has reason to believe" to be "correct as far as it goes," lays great stress on the resistances which prevent the emergence into consciousness of parts of the unconscious mind, and describes the aim of a psycho-analysis as the overcoming of these resistances. In the replies to criticisms of psycho-analysis, which replies (provided by the President of the British Psycho-Analytical Society) and criticisms the Committee "leaves to the judgment of the reader," the element of resistance in the attacks of critics is emphasised. Thus the Committee, while declining to commit itself upon the truth or value of Freudian psycho-analysis, may fairly be said both to treat it with respect and to recognise that the charge of emotional prejudice which psycho-analysts make against their critics may have some foundation.

NEOSALVARSAN AS A PULMONARY ANTISEPTIC.

INTEREST in chronic lung diseases and the applications of surgery to their treatment has been greatly stimulated by Dr. R. A. Young's masterly review of this subject in his Lumleian Lectures delivered in London in March of this year.[1] Of such conditions there are few that demand greater care and judgment on the part of the physician than that of empyema, particularly when streptococcal in origin, and of chronic bronchiectasis. In the former there is general agreement that too early operation may and in fact usually does lead to that troublesome condition, chronic empyema. This result of treatment by open operation has led many workers to treat such cases by continuous aspiration, with or without irrigation of the cavity with some form of antiseptic solution. That most usually employed has been Dakin's solution—neutral 0·5 per cent. solution of sodium hypochlorite—though others have also found their advocates. Recently Dr Hans Edel[2] has recorded a few cases which he has treated with intrapleural injection of neosalvarsan. His treatment has been to aspirate the pus through a needle of moderate size, using the same needle to inject at once a solution of neosalvarsan. Edel has found that the pleura is able to withstand large doses of this solution without undue reaction; thus his usual initial dose has been 0·45 g. dissolved in 10 c.cm. distilled water, which is gradually increased up to 0·6 g. according to the general reaction and the degree of refilling of the empyema. The surprising tolerance shown by the pleura to such high dosage suggests to Edel that considerable local thrombosis occurs round the site of the injection. It is, of course, well known that neosalvarsan even in far weaker solutions is a powerful antiseptic, especially against streptococci, and it is natural that the attempt should be made to utilise it at the site of infection instead of in the blood stream alone. Edel has gone further and has injected solutions of similar strength (from 0·15 to 0·6 g. dissolved in 10 c.cm. of water) into the bronchial tree in cases of bronchiectasis. His method has been similar to that used for the introduction of lipiodol into the lung, namely, cocainisation of the trachea and direct injection through a laryngeal catheter. In the few patients he has so far treated Edel reports considerable success, the total quantity of neosalvarsan used being in one case as much as 5·25 g. Another patient suffering from right-sided pulmonary gangrene and empyema received in all 0·9 g. into the pleura and 2·7 g. into the lung, a total of 3·6 g. The patient became afebrile two days after the first injection and in 12 days the empyema had disappeared, "cure" resulting in seven weeks, though the X ray still showed some thickening of the pleura. The local application of arsenical bactericides in pulmonary conditions is a method to be watched with interest, although clinicians may hesitate to copy the high dosage employed by Dr. Edel until further results have been reported.

[1] THE LANCET, 1929, i., 593, 697, and 805.

[2] Die Lokalbehandlung eitriger Lungenprozesse mit intrathorakalen Neosalvarsan-injektionen, Med. Klin., April 26th, 929.

LOSS OF APPETITE IN CHILDHOOD.

THE literature of anorexia in children is voluminous and the underlying causes sponsored by individual writers innumerable. Some fresh light has, however, been recently thrown on the subject by a stimulating article from the pen of Dr. Joseph Garland,[1] who attributes the trouble essentially to a failure of management in the earliest weeks of life and confirmed in childhood by improper training and discipline. Thus he suggests that the initial loss of weight that occurs before the establishment of complete lactation is in itself an advantage to the baby, as during these first few days the sensation of appetite has time to develop, a sensation that the baby is never likely to lose subsequently. Once breast feeding has been established a transient loss of appetite is a usual occurrence during acute febrile disturbances, and may in fact be interpreted as a protective mechanism since the gastro-intestinal tract, under the circumstances, is not commonly prepared for the reception and utilisation of food. It is frequently found that the mother's greatest source of anxiety during the illness of a child is the failure to take nutriment, and it may require considerable patience to explain the situation to her. In many cases it should be realised that the appetite difficulty is not a real one at all, but exists only in the fertile imagination of the over-anxious parent. This is often the case with infants at the breast who take their feeds so rapidly that the mother becomes obsessed with the idea that little or no milk has been taken; weighing the baby before and after feeds will generally banish this illusion. Sometimes an artificially fed infant will fail to finish its carefully calculated allowance but continues to gain at a satisfactory rate. This baby does not require as much food as another infant of the same age and weight. One of the greatest boons that could be granted mankind would be an appreciation of the fact that all human beings are individuals with varying digestive capacities with varying temperatures, levels of activity, and caloric requirements.

The period of starting new foods, which includes very definitely the weaning period, presents often the first great obstacle to the continuation of a normal appetite. Habits of feeding have become firmly fixed, and infants, like their elders, resent change. Where such difficulties arise it is absolutely essential to ensure firmness in management on the part of mother and nurse, even if this entails two or three days' misery for all concerned. The physical

[1] Garland, J.: New Eng. Jour. of Med., 1929, cc., 1135.

causes of anorexia, admittedly much less frequent than the psychic, are usually quite apparent in themselves, although frequently it is necessary to disabuse a parent or nurse of the idea that a physical cause exists where in reality a search reveals none, and where it is obvious that the true fault lies elsewhere. It should be mentioned that over-feeding with milk is a natural mistake which a zealous mother frequently makes without realising the fact that milk, particularly with a child over a year old, is a very filling and appetite-destroying food; in no case should a child be given more than a pint a day. The importance of fatigue upon appetite cannot be over-estimated, and is especially apparent as a result of the intense "urbanisation" to which the modern child is subjected. Even in play the possibility of fatigue is present and disaster frequently awaits the highly strung child, who forces himself to follow the leadership of older and stronger children. It can readily be seen how difficult it is to analyse the cause of anorexia in a given case, and how much reliance must be placed on a detailed history of the home life and surroundings. While the shortcomings and difficulties of the particular case are being poured out by the despairing parents, the child himself is delighting in the fact that he will not eat a morsel of vegetables and that only with the utmost coaxing can he be persuaded to take any milk pudding. What a little price, he may well feel, is the loss of a few meals for such a sense of importance? Many children will not eat because that is what is expected of them, but who can blame them when they hear their parents discussing their own food idiosyncrasies at every meal?

The clinical picture is known to all but the correct lines of treatment are difficult to carry out. Dr. Garland indicates some of them. A thorough explanation of the situation should be given to both parents in the absence of the child and they should be exhorted to ignore all symptoms and never discuss details of the patient's management in front of him. It should be almost unnecessary to remark that heaping a child's plate with all that he is supposed to eat for the entire meal is to discourage him from the start. In the same way the meal should be attractively served on a tray, which is removed without comment at the end of a specified time and under no circumstances should he be urged or bribed to eat. In many instances it will be advisable to separate the child entirely for a time from his home surroundings and place him among other children where he will have companionship and judicious management. The whole subject is admittedly difficult and indicates the necessity for adequate instruction of parents in mothercraft, so that the child's habits can be trained on correct lines from the beginning.

A MODEL MEDICAL MUSEUM.

THE museums of most of our medical schools contain magnificent accumulations of admirable preparations. But as instruments of education they suffer from three substantial defects: (1) the rare and curious is much too prominent; (2) their arrangement fosters the notion that pathology has to do with states rather than processes; (3) the labelling and accessory illustrations are wholly inadequate, chiefly, we fancy, because the things in bottles are primarily looked upon as the objects in guessing competitions in examinations. The ideal that the exhibits in a museum should be illustrations of a text-book of their subject and should be amply supplemented by reading matter, pictures, diagrams, and so forth, has for a long time guided the arrangement of zoological and antiquarian collections. Those who wish to see the same plan applied to medicine should visit the museum at 33, Gordon-street provided by the generosity of Mr. Wellcome and presided over by Dr. Daukes. If they have not been before, they will be surprised, and we believe delighted. In a well-illustrated volume[1] (which may be had gratis from the museum by those interested) Dr. Daukes has explained the theory and practice of what he has done in a very interesting and informative way. We hope he will gain many converts to his methods, and those who are not prepared to go with him all the way will find many useful hints about museum technique.

RADIUM TECHNIQUE.

A POST-GRADUATE course on radium therapy will be held at St. Bartholomew's Medical College, London, from Monday, Sept. 30th, to Thursday, Oct. 3rd. Entry to the course, which will be of an introductory character, is limited to about 30 men, those who are likely to work with radium being preferred. Lectures will be given on the physical properties of radium and radon by Prof. F. L. Hopwood, on the biological aspect of radium by Dr. R. G. Canti, on its surface application by Dr. N. S. Finzi, and on its use in combination with deep X rays by Dr. W. M. Levitt. The applications of radium to the treatment of special regions will be made by Sir Charles Gordon-Watson for the rectum, Prof. G. E. Gask for the tongue and mouth, Dr. Malcolm Donaldson for gynæcology, Mr. Douglas Harmer for the larynx and air passages, and Mr. Geoffrey Keynes for the breast. On each day there will be demonstrations in the out-patient department or in the wards, and on three of the days operations will be carried out by members of the staff, including, besides those already mentioned, Dr. J. D. Barris, Mr. F. A. Rose, and Mr. Bedford Russell. Application for admission to the course, which is something of a new departure, should be made to the Dean of the Medical College. The terms may be seen in our advertisement columns.

One important side of radium technique is dealt with in our own columns this week by Dr. Joseph Muir of New York, who has made the subject peculiarly his own, for it was he who originated the use of the screened radon seed in the treatment of malignant growths. That the method opens up a promising line of work was admitted by Prof. Gask when addressing the British Empire Cancer Campaign a year ago.[2] Surrender of the use of radon is by no means a foregone conclusion even should a largely enhanced quantity of radium become accessible for general use in the near future, for increasing stress is being laid on the unwisdom of allowing radium element to leave the centres where it can be jealously guarded. Dr. Muir has for long championed the use of the glass tube containing radium emanation encased in a layer of platinum 0·3 to 0·4 mm. thick; although somewhat larger than the gold seed in common use in America, it has the advantage of being watertight and smooth, while it can be removed as soon as the treatment is concluded by means of the threads which are left in position. The unscreened or bare tube Dr. Muir regards as standing condemned owing to the zone of necrosis which invariably forms around it. In the œsophagus the dangers of tissue necrosis are great enough even with the screened tube, and sloughing in this position means a fistula into lung or trachea with rapidly fatal results; but even in complete stricture Dr. Muir claims to have restored the lumen of the œsophagus and to have so far relieved the patient as to permit him to resume ordinary diet and habits. In the uterus when the cervical canal is completely blocked by malignant tissue, he regards it as possible for a skilful operator to implant such screened seeds in the highly friable tissues without inflicting further trauma, and in this way so to clean up the malignant area as to render possible the more usual application of radium.

[1] The Medical Museum. By S. H. Daukes, Director of the Wellcome Museum of Medical Science. London: Wellcome Foundation, 33, Gordon-street, W.C. 1929. With 44 figures. Pp. 172.

[2] THE LANCET, 1928, i., 844.

In prostatic cases the radon seed enables escape from the prolonged hospital stay which deters from other forms of treatment.

THE WELFARE OF THE DEAF.

ON Thursday next, July 11th, at 3.30 P.M., the National Institute of the Deaf will hold its fifth annual meeting at the Caxton Hall, Westminster, S.W., when Lord Charnwood, who will preside, will be supported by Sir Frank Benson, Mr. Somerville Hastings, M.P., and others who realise the importance to the community of promoting the interests of the deaf. There are some 40,000 persons in Great Britain who have been deaf from birth or very early life, and while it is incumbent upon the State to make proper provision for these unfortunate people who demand our utmost sympathy, the loss in personnel and money to the country from want of proper attention to this afflicted class is very great. The appointment by the Government of a Departmental Committee at an early date to investigate this question was advocated by the Duke of Montrose in vigorous terms at the last annual meeting of the Institute, while it is now 40 years since any Government Department has made inquiry along the needed lines. The industrial hardships caused by deafness and their grave social implications were emphasised at an important meeting of the Institute, which was held at the London Mansion House three years ago, when the Duchess of Atholl pleaded the cause of the deaf eloquently. Much has been done by the untiring efforts of the Institute, in spite of financial difficulty, but official help is needed for much remains to be done. The meeting at the Caxton Hall next Thursday will be open to the public, who are invited to lend their support.

MATERNITY AND CHILD WELFARE CONFERENCE.

WHAT bids fair to be a most successful meeting, promoted by the National Association for Prevention of Infant Mortality in conjunction with many other allied bodies, opened at Friends House, Euston-road, on Tuesday last. The Marchioness of Aberdeen and Temair, who presided at the inaugural session in the unavoidable absence of the Minister of Health (who is to deliver his Presidential address later in the week), referred to the world-wide interest now awakened in this subject and the recognised need for obtaining the full coöperation of the fathers in the movement. Lady Aberdeen laid great stress on the disastrous results to family life from the maternal morbidity and morbidity dating from childbirth, and also gave expression to the general rejoicing and relief at the recovery of H.M. The King from his recent illness. After wishing success to the deliberations of the delegates, who number nearly 1000 and include representatives of the overseas Dominions and more than 36 English-speaking countries, Lady Aberdeen presented the challenge shields and prizes to the successful competitors in the various competitions arranged under the auspices of the National Baby Week Council. The Imperial Challenge Shield, which was won last year by Benoni in the Transvaal, has been won for 1928–29 by Kalutara, Ceylon, and Dr. C. P. Williams, Medical Officer of Health for Ceylon, was in attendance to receive the Certificate of Merit on behalf of the Kalutara Baby Week Committee. The Maharaja of Burdwan presided in the afternoon, and the whole of the first day was devoted to the consideration of the welfare of the child between 1 and 5 years. The branches of the subject discussed included child guidance clinics, the State care of children, the prevention and cure of crippling, and the handicap of illegitimate children, whilst the psychological aspect of the problem was debated in the evening at the annual meeting of the Association of Infant Welfare and Maternity Centres. Among the other subjects for discussion at the conference are maternal morbidity, special V.D. clinics in connexion with maternity and child welfare held departments, and methods of preventing undue delay in the out-patient departments of hospitals.

THE Imperial Social Hygiene Congress will be held from July 8th to 12th at Livingstone Hall, Broadway, London, S.W. 1., Lord Linlithgow presiding. Invitations have been sent to the Governments, universities, and organisations concerned with social hygiene throughout the Empire, and 200 delegates are expected.

INDEX TO "THE LANCET," VOL. I., 1929.

THE Index and Title-page to Vol. I., 1929, which was completed with the issue of June 29th, is now in preparation. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2. Subscribers who have not already indicated their desire to receive Indexes regularly as published should do so now.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg. Capt. J. H. Fergusson to be Surg. Rear-Admiral.

The following appointments are notified: Surg. Lt.-Comdr. (D.) C. Williams to *Pembroke*. Surg. Lts. H. L. Duncan to *Carysfort*, T. A. Cochrane and J. Cassen to *Vivid*, W. P. E. McIntyre to *Effingham*, J. W. Nesbitt to *Cleopatra*, and E. B. Pollard to *Victory XI*.

ROYAL NAVAL VOLUNTEER RESERVE.

Surg. Sub.-Lt. D. M. Craig to be Surg. Lt.

Proby. Surg. Lt. A. H. Shelswell to be Surg. Lt.

The following appointments are notified: Surg. Lt.-Comdr. R. H. O. B. Robinson to *Victory*, for R.N. Hospital, Haslar. Surg. Lt. R. L. S. Stubbs to *Pembroke*, for R.N. Barracks.

ROYAL ARMY MEDICAL CORPS.

Capt. P. N. Creagh (late R.A.M.C., T.F.) to be Temp. Capt., and temporarily relinquishes the rank of Capt.

ARMY DENTAL CORPS.

Capt. A. F. Salsbury to be Maj.

TERRITORIAL ARMY.

Lt.-Col. H. F. Humphreys to be Bt. Col.

Maj. G. H. Stevenson (late R.A.M.C., Militia) to be Maj.

Capt. R. K. Nisbet relinquishes his commn.

Lt. D. C. Vaughan to be Capt.

Lt. E. S. Kirkhouse (late 3rd Bn. K.O.S.B.) to be Lt.

G. B. Matthews to be Lt.

Supernumerary for Service with O.T.C.—2nd Lt. G. B. Scholefield (late R.E.) to be Lt. supern. for serv. with Med. Unit, Univ. of Lond. Contgt., Sen. Div., O.T.C.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Maj. C. B. Baxter, from Active List, to be Maj.

Lt. L. Gardiner (Army Dental Corps), from 6th Bn. E. Surrey R., to be Lt.

INDIAN MEDICAL SERVICE.

Capt. L. K. Ledger to be Maj.

Temp. Lt. Mir Saleem Mahmood relinquishes his temp. commn.

DEATHS IN THE SERVICES.

Lt.-Col. George Henderson, late I.M.S., who died at Inverness on June 23rd in his ninety-third year, was educated at Aberdeen University and graduated M.D. in 1858, obtaining the L.R.C.S.E. in the same year. In the following year he went to India and for some time served in the Indian Medical Department as civil assistant surgeon at Shahpur. In 1865–67 he became officiating professor of medicine and surgery at Lahore Medical College and afterwards superintendent of the Lahore Central Jail. Later he became officiating superintendent of the Botanical Gardens in Bengal and professor of botany in the University of Calcutta. Subsequently he was appointed civil surgeon at Gujranwala and also served at other stations in the Punjab. He retired in 1890. Lt.-Col. Henderson leaves a widow, two sons, and two daughters.

The Clinical Interpretation of Aids to Diagnosis.

A Series of Special Articles contributed by Invitation.

XXXVI. CHARTS OF FRACTIONAL TEST-MEALS.

PART I.*—NORMAL CURVES.

GASTRIC analysis is a less exact procedure than the majority of biochemical investigations, for not only do the stomach contents exhibit a greater normal variation in their chemical composition than do most substances recoverable from the body, but this variation is itself dependent on a series of factors which change in a given individual from hour to hour and from day to day.

The Variable Factors.

The more important of the variables concerned may be divided into: (*a*) extrinsic, and (*b*) intrinsic factors—and these may be further subdivided in the following manner:—

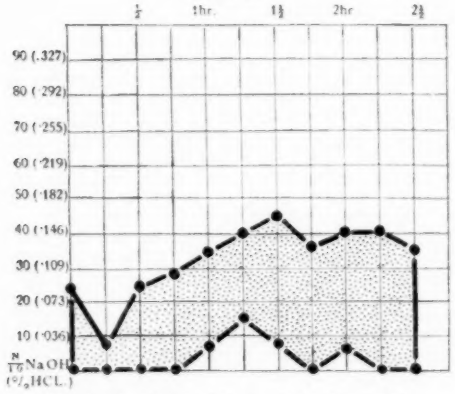
Extrinsic Factors.—(1) *The composition of the meal.* This will vary even when a fairly simple dietetic material, such as oatmeal gruel or toast and water, is selected in every case.

(2) *The Fasting Stomach Content.*—This varies considerably from case to case and even in the same individual from day to day.

Intrinsic Factors.—(1) The *stomach content* at any moment is a mixture of food, of secretion from the gastric glands, of secretion from the salivary glands, and of duodenal contents regurgitated through the pylorus. Not only do these factors vary from individual to individual, but in every individual there is some degree of daily personal variation.

(2) *Psychic factors* can be of great importance. Difficulties in swallowing the tube and apprehension after swallowing it will sometimes cause an inhibition of gastric secretion, and as the subject under investigation is almost invariably being examined for the

FIG. 1.



The limits of normal curves for free HCl.

first time, inhibition is a factor which must be taken into account.

(3) *Errors in Sampling.*—The stomach contents are never homogeneous. Those recovered from the pyloric antrum are usually more acid than those at the cardiac end, and in addition it is obvious that in an actively secreting stomach the contents close to the mucosa will be the first to receive secretion. Experience in the withdrawal of samples for gastric analysis overcomes grave error from this cause in most cases, but it is clear from the foregoing paragraphs that inexperience in the practical side of collecting samples for gastric analysis is a more important potential source of error than is the possibility of inexpert chemical analysis of the samples themselves.

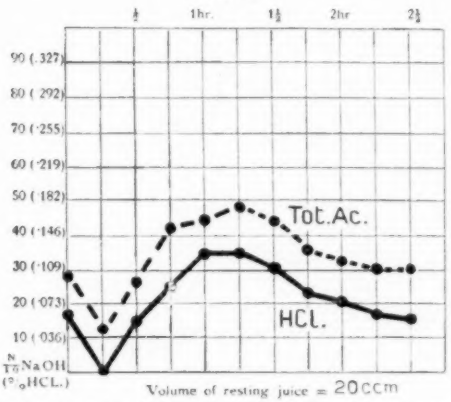
For these reasons, whenever an important decision rests on the interpretation of a fractional gastric analysis, the recovery of the samples should be confided to someone fully experienced in the procedure.

Collection of Samples.

If, however, the practitioner himself desires to collect the samples, it should be done according to the following technique, fuller details of which are available in current text-books.

The patient is allowed no food or drink after 9 o'clock on the night preceding the examination. At that hour it is well to give some charcoal biscuits or a glass of milk containing powdered charcoal, in order to provide a substance readily recognisable if a high degree of pyloric stenosis is present. On the morning of the examination, about 9 o'clock the patient swallows the tube and by means of a 20 c.cm. "Record" syringe the whole of the fasting stomach content is withdrawn, measured, and carefully preserved. If the total bulk is less than 10 c.cm., it is probable that the stomach had not been completely evacuated, and it is sometimes well to introduce one or two syringes full of warm water to assist in recovering the residual contents. In such cases it must, of course, be noted that the fluid withdrawn has been diluted by the water added.

FIG. 2.



The average normal curve for free HCl and total acidity.

The stomach being empty, the patient, with the tube in position, is given a pint of gruel made by boiling two tablespoonfuls of fine breakfast oatmeal in a quart of water until the total bulk has been reduced to one pint. The mixture is then strained and flavoured with salt, unless chloride estimations are to be made.

It is at that stage of the examination that the patient is most likely to experience discomfort or nausea, and, therefore, a light magazine or daily newspaper should be provided and the patient encouraged to read very attentively for at least ten minutes. At quarter-hourly intervals, after swallowing the meal, samples of 5–10 c.cm. are withdrawn by the syringe and preserved in test-tubes, labelled one-quarter, one-half, &c. Care should be taken to ensure that these samples are recovered from the stomach contents and not from the duodenum or some isolated loculus. This can be accomplished by noting that the tube is at the right depth and occasionally withdrawing it one or two inches, or getting the patient to swallow it deeper if its position has materially changed.

If the stomach appears to empty with undue rapidity, the tube should be moved about and aspiration attempted in different positions before it is assumed that the contents have all passed on. At the end of 2½ hours it is usual to empty the stomach completely and to make a note of the volume of the contents, a 10 c.cm. sample of which is preserved for analysis. The samples thus collected, together with

* Part II., on the interpretation of charts in patients showing high acidity, low acidity, and of charts suggestive of gastric carcinoma will follow next week.

notes concerning the patient and the total volume of the fasting content and the final residuum, may be forwarded to a laboratory for analysis and will not undergo material chemical change during a period of fully 12 hours.

Details of the Report.

A report of a fractional gastric analysis should supply information on the following points:—

(*a*) The volume and character of the fasting stomach content.

(*b*) The character of the samples recovered at intervals after the taking of the test-meal.

(*c*) The volume and character of the total stomach content at a sufficiently long time after the taking of the meal for it to be reasonably expected that the stomach will be nearly empty. Two and a half hours is usually the longest time over which the examination is continued, but in cases of pyloric obstruction the analyst sometimes continues to extract specimens for three hours or longer. In any case, the total volume of the stomach content at the end of the examination should be determined and recorded.

As in every laboratory procedure, it is wise to supply the analyst with brief details of the case and special points requiring particular investigation. Thus, in a case of suspected cancer of the stomach it will always help the analyst if he is informed of the provisional diagnosis, and he will in such circumstances apply particular attention to the investigation of the fasting stomach content and may make special search for occult blood, lactic acid, or the presence of abnormal cells in the samples investigated. Or, again, in cases of suspected pernicious anæmia, he may, if warned, proceed to special tests with a view to determining whether an achlorhydria is absolute or whether under additional stimuli the mucosa may be capable of producing some acid.

Normal Curves.

The accepted standard of the normal in fractional gastric analysis is derived from the series of 100 healthy medical students examined by J. A. Ryle and T. I. Bennett, who showed that in 80 per cent. of such subjects the fasting stomach content did not exceed 100 c.cm. and might be almost completely absent; also, that the free HCl fell practically to nil immediately after taking the meal, and subsequently rose to a height somewhere below 50 N/10, falling away from this point during the later time of the investigation. Fig. 1 shows a shaded area within which fall all the readings for free HCl in any of these 80 per cent. of normal subjects, and a curve which conforms roughly to this shaded area must at once be accepted as not differing materially from the normal average.

The Curve of Total Acidity.—This in normal subjects is closely parallel to the curve of free HCl and stands at 10–20 c.cm. higher than the former curve. The two curves are never exactly parallel owing to factors such as regurgitation from the duodenum occasionally diminishing the free HCl without so greatly affecting the total acidity.

It will be observed that the curves, both of free and total acidity, tend to rise during the first hour and to fall subsequently. The shape of the average normal curve calculated from a large series would, therefore, be somewhat as shown in Fig. 2, but the relatively wide shaded area in Fig. 1 makes it clear that a considerable departure from the *average* may occur without anything approaching abnormality being present.

Exceptional "Normal" Curves.

In our study of healthy subjects we observed that extreme deviations from the normal might occur in an important percentage of cases. Thus about 5 per cent. showed a complete absence of HCl with a low total acidity, and about an equal number showed a very abundant secretion with a high concentration of HCl. Although such pictures are most frequently encountered in pathological conditions and will be referred to again in later paragraphs, it must never be forgotten that they may occur in normal men.

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Physician to Out-patients, Middlesex Hospital.

Special Articles.

TUBERCULOSIS ASSOCIATION.

ANNUAL PROVINCIAL MEETING, CAMBRIDGE, JUNE 27TH–29TH.

THE meeting which was held in the Medical School at Cambridge from Thursday, June 27th, to Saturday, the 29th, was divided into four sessions.

I. THE PREVENTION AND HEALING OF TUBERCULOSIS BY TURTLE-VACCINE THERAPY.

Dr. ERNEST WARD (Paignton) being in the chair,

Dr. FRANZ NAGELSCHMIDT (Berlin) said that if the turtle-vaccine therapy had been used systematically from the time of its discovery by Friedmann, much of the expenditure on the campaign against tuberculosis, which had had relatively meagre results, could have been avoided. For various reasons the method had fallen into early disrepute, but in various countries about three million cases had now been treated by it, and protective inoculation had been extensively carried out, so that we were now in a position to review the results and revise any hasty judgments. The main stated objections to turtle-vaccine therapy were that it was too dangerous, that it was too harmless, that the tuberculous lesions would have healed just as well without the vaccine, and, finally, that many of the cases so treated were not tuberculous. Since 1922, the opponents of the vaccine had ceased to say that it was dangerous or that the bacilli might become virulent; on the other hand, it was evidently not inert, as witness the report of the American Board of Health, and the experimental results of guinea-pig immunisation against tuberculosis by Aronson in 1914, and by Rabinovitch, Klebs, Klemperer, and Reichenbach. It would be difficult to refute the objection that the cases would have healed just as well without vaccination, but Szalai, in Hungary, had inoculated with turtle-vaccine more than 15,000 patients in the last few years, and had lowered the death-rate from tuberculosis by more than 60 per cent. Willies, in dealing with a heavily infected group of 75 baboons, had vaccinated 35 of them; 40 were unvaccinated, and all died; whereas of the 35 vaccinated ones only one, which had very advanced tuberculosis, died. All the others healed or kept well, except two which fell from a rock in the Hagenbeck Zoo. Autopsies on these animals showed that they were free from tuberculosis. The last objection—viz., that the vaccinated cases were not tuberculous at all—did not require serious refutation.

The Nature of the Vaccine.

Vaccination with the turtle tubercle bacillus, published by Friedmann in 1912, was fundamentally different from vaccination with extracts of bacteria or of dead tubercle bacilli. It represented an active immunisation with a species of living tubercle bacilli which was avirulent for warm-blooded animals. The bacillus was not a saprophyte, and it could live long enough in the human or animal body to produce strong and lasting immunising effects. Other species of tubercle bacilli were of no use for this purpose. The living tubercle bacillus of human and bovine origin must be rejected because, even in a weakened form, it could become virulent by injection into the human or animal body. Up to the present time only the turtle tubercle stock grown in 1903 from the tuberculous lungs of a sea-turtle with spontaneously acquired tuberculosis answered all the demands that a tubercle vaccine suitable for men and other warm-blooded animals should fulfil. The turtle tubercle bacillus was non-pathogenic in the bodies of warm-blooded animals; the optimum temperature for its culture was 98·6° F., and it could be kept alive or active in the human or animal body for many months or years. The turtle bacillus stock had not changed biologically since its original culture. The characteristics of growth on artificial media, its ability

to create immunity against tuberculosis of bovine or human character in warm-blooded animals, and to heal non-advanced tuberculosis had not been changed. So that it was a real "virus fixe." Even though the turtle vaccine was not able to produce a tuberculosis of the human or bovine type, it could produce an immunity to both types. This was shown by the fact that individuals giving a negative reaction to tuberculin generally reacted positively to prophylactic or curative turtle vaccination.

In regard to the prophylactic power of the turtle vaccine, Dr. Nagelschmidt cited the case of two parents with open tuberculosis who had five children, the first and last of whom were vaccinated. The intermediate three children all died of tuberculous meningitis. In all the later literature no case showing harmful results following vaccination had been published.

Technique.

In order to get the best results with the vaccine, said Dr. Nagelschmidt, it was important to follow Friedmann's directions exactly. Patients with tuberculous cachexia, with multiple tuberculous foci, generalised tuberculosis and meningitis, &c., were unsuitable for such treatment. Children with tuberculous lesions, on the other hand, showed striking improvement, as, for example, in fistulæ, and in bone, joint, and gland tuberculosis.

The vaccine was prepared under the supervision of Prof. Kruss, Director of the Leipzig University Institute of Hygiene. It was made in three strengths, varying in the number of bacilli to the ampoule, the grades being labelled "very weak," "weak," and "strong." The contents of each ampoule were about 0·5 to 0·7 c.cm. The injections were made subcutaneously, the site of election being 2–3 inches behind the greater trochanter. Intravenous injection was made only in special cases; as for example, in early and encapsulated tuberculosis of joints; recent and closed spondylitis without abscess formation; Poncet's tuberculous rheumatism of joints; recent tuberculous iritis, choroiditis, uveitis, and episcleritis; early unilateral renal tuberculosis; tuberculous orchitis, and epididymitis, with or without fistulæ. The treatment advised in these cases was an intravenous injection of 0·1 to 0·5 c.cm. "weak," together with a subcutaneous injection of 0·1 to 0·5 "strong."

Prophylactic vaccination might be undertaken if possible immediately after birth. Infants should receive 0·5 c.cm. "weak." In somewhat older children with small tuberculous foci the dose should be 0·5 c.cm. "very weak." The protection thus set up lasted for 10 to 12 years, but might cease sooner in cases exposed to massive, virulent, or frequent infection. Intercurrent infections, such as influenza and whooping-cough, destroyed the immunity, and in such case revaccination should be carried out. Revaccination should also be done in the event of the development of a tuberculous focus.

In surgical tuberculosis, the only cases not suitable for treatment were those which had, or were suspected to have, closed and deep-seated abscesses. If, however, these abscesses were about to perforate or were near the skin surface, they could be opened surgically, allowed to form fistulæ, and six weeks later an injection of turtle vaccine could be given. An alternative method was to give an injection of vaccine at once, and the abscess allowed to perforate spontaneously. After vaccination cold abscesses flared up, perforated, and then healed.

A local tissue reaction at the site of injection was noticed in some cases consisting of small abscesses or the formation of granulation tissue containing giant cells and turtle tubercle bacilli. The appearance or non-appearance of a local tissue reaction was not always essential for a prognosis, but its character was often a useful guide in the further treatment of the case.

In pulmonary tuberculosis the more chronic and inactive the disease the smaller the dose given, the more active the disease the larger the dose.

Experiment on a Large Scale in Prophylaxis and Treatment.

Dr. Nagelschmidt then described an experiment conducted in Pest-erzsebet, a suburb of Budapest. It was, he said, a manufacturing town of about 60,000 inhabitants, with approximately 90 per cent. of workmen. The people were very poor, and the houses were mostly very miserable and very damp. Six to nine people often shared one room. Two to three slept in one bed, many on the floor. The town had no money to support people out of work, or to supply them with food and milk. The conditions were incredible in a civilised country.

A physician of the town, Dr. Eugen Szalai, heard of the turtle vaccine method, went to Berlin to study it, and then gave about 2000 vaccinations in 1922. Soon after this a period of famine, revolution, and inflation ensued, and his work was interrupted until July, 1925. At this time Dr. Szalai introduced compulsory notification of cases of tuberculosis, clinically diagnosed as well as open cases, and again instituted the turtle-vaccine therapy and prophylaxis. No other method of treatment was used, and the results were striking.

In the whole of Hungary there were 52 towns with more than 10,000 inhabitants (in 1922 there were 49). These 52 cities had in 1923 an average mortality from tuberculosis of 33 in 10,000. Pest-erzsebet had 39 deaths per 10,000. In 1928 Pest-erzsebet had only 18 deaths as against 28·8 in Budapest, and an average of 26·4 in the 52 towns. In 1923 Pest-erzsebet held the thirty-seventh place among the 52 Hungarian towns and to-day it took the sixth place. Dr. Nagelschmidt was confident that at the end of the present year it would hold the first place. The physicians of Pest-erzsebet stated that cases of advanced tuberculosis were now rarely seen. This was the first experiment with turtle vaccine therapy on a large scale in one administrative area.

In the years 1925, 1926, and 1927 4812 cases of pulmonary tuberculosis in the first stage were treated. Of these 12 died, 9 became worse, and the remainder were cured. 216 cases in the third stage were vaccinated. Of these 67 died, 23 cases became progressively worse, and 109 resumed their work. 125 cases of the third stage were not treated with vaccine. Of these 115 were dead and 10 became worse; not a single case improved.

In conclusion, Dr. Nagelschmidt said that no untoward results had followed the vaccination; that in really early cases of tuberculosis the percentage of clinical healing reached 98 per cent.; that in tuberculosis of infants healing almost always occurred; and that turtle vaccination should be tried in almost all cases of surgical tuberculosis, for operative measures could often be avoided by its judicious use.

Discussion.

The CHAIRMAN said he would like to have heard more about Dr. Nagelschmidt's own cases, and also about the cases treated in this country. He remembered that about 1913 there were three vaccines of live avirulent tubercle bacilli in use—viz., those of Friedmann, Calmette, and Nathan Raw. In his opinion the results of treatment were not impressive. It was an unfortunate feature of all the "cures" for tuberculosis that they only gave good results in early cases. He asked Dr. Nagelschmidt how the vaccine was prepared, what was the correct method of dosage, and how many bacilli there were in each ampoule.

Dr. S. VERE PEARSON (Mundesley) asked how much publicity had been given to the method of preparation. As far as he recollected, the method of preparation of the Friedmann vaccine had not been published in full. He inquired why the turtle tubercle bacillus had been chosen for the vaccine in preference to avian and reptilian bacilli.

Dr. F. R. WALTERS (Farnham) expressed the view that it was a great drawback if a remedy was only available for early cases, and emphasised the tendency to spontaneous cure in tuberculosis. He looked forward to the publishing of further evidence.

Dr. W. H. DICKINSON (Newcastle-on-Tyne) felt that the results given by Dr. Nagelschmidt were almost too good to be true. He had seen ten cases

treated by the method, but the vaccine had been given only six weeks ago, and it was much too early to make any satisfactory deductions. He was satisfied, however, that the cases were improving.

Dr. A. DE W. SNOWDEN (New Forest) inquired whether early laryngeal tuberculosis was a contra-indication to the administration of the vaccine.

Dr. G. T. HEBERT (London) was impressed by the results of treated cases, but thought that the statistics needed very careful scrutiny. He was also impressed by the fact that only one dose of the vaccine was given, and the patient did the rest.

Dr. G. E. SOLTAU (Nayland) said that she had seen 14 cases treated, and that surgical cases had done very well. The pulmonary cases were no worse, and several were a good deal better. Some had developed small abscesses at the site of the inoculation.

Reply.

Dr. NAGELSCHMIDT said that it was impossible in a short paper to give detailed information. Each case needed individual treatment. One had to use great care in vaccinating cases of lupus. No hard-and-fast rule, however, could be laid down concerning dosage. He admitted the possibility of spontaneous cure, but maintained that it was not possible to tell beforehand which of the cases were going to heal. He did not know how the vaccine was prepared, nor did he particularly wish to know. He was content to leave that to the manufacturers. He did not know how it differed from the Friedmann vaccine. Tubercle bacilli from birds and reptiles had been tried without good results. They could not live long enough in the human blood to produce the desired effect. The Calmette preparation was, in his opinion, much too dangerous. Laryngeal tuberculosis was not in itself a contra-indication to the use of the turtle vaccine, but only because it was usually associated with very advanced cases of pulmonary tuberculosis. He advised his audience to treat early cases only. Advanced cases could only be dealt with successfully by physicians who had had great experience with the vaccine.

II. THE DIAGNOSIS OF INTRATHORACIC TUBERCULOSIS IN CHILDREN,

Dr. F. R. WALTERS (Crooksbury) being in the chair,

Dr. C. D. AGASSIZ (Highwood), in his opening paper, said that what one was taught and what one read about the diagnosis of intrathoracic tuberculosis in children gave a somewhat false picture of what was found in actual practice. He thought that a solid basis for diagnosis might be reached by studying three groups of cases—viz., (*a*) those in which tubercle bacilli had been found in the sputum; (*b*) those in which a diagnosis of pulmonary tuberculosis had been arrived at, without the presence of tubercle bacilli in the sputum or fæces; and (*c*) those in which the signs and symptoms were indefinite.

Group A consisted of 87 T.B.+ children (24 boys and 63 girls), 40 of whom (46 per cent.) had a history of direct contact with a case of tuberculosis. It was notable that only in one case had tuberculosis developed after an attack of infectious fever. In the majority (63) the onset was marked by cough, accompanied by wasting in 20 cases, pain in the chest in eight, lassitude in four, and anorexia or malaise in three. The first sign in three cases was hæmoptysis. In four cases there was a history of pneumonia or pleurisy followed by cough, and in three an attack of influenza. Somewhat to his surprise, night-sweats occurred in 27 cases, and dyspnœa, either at rest or after exercise, was observed in 33 cases. Physical examination showed that in practically all this group the signs were mainly or primarily apical—i.e., the clinical picture resembled that of pulmonary tuberculosis of the adult. From the literature one would gather that in children pulmonary tuberculosis of the adult type was very rare; yet here was a series of established cases in which the adult type was not the exception, but the rule.

It might be argued that these were cases of extensive disease, and that the adult type might reasonably be expected in them. He therefore analysed the 47 cases falling into *Group B*. Of these, 24 (51 per cent.) gave a history of direct contact with a case of tuberculosis. A history of cough was obtained in 31 cases, accompanied by wasting in ten, lassitude in five, pain in the chest in two, and anorexia in two. In one case the first sign was hæmoptysis, and in two the cough was accompanied by hæmoptysis. In five cases there was a preceding history of pneumonia or broncho-pneumonia, in two of influenza, and in only one did the symptoms date from an attack of measles. In ten cases night-sweats were present, and in ten dyspnœa was observed. In this series also the physical signs were mainly apical. This fact was even more evident than in the first group, because the disease was usually less extensive.

On turning to the less definite cases in *Group C*, in which the physical signs were slight, it was found that the evidence, although not so clear-cut as in the first two groups, was still similar. Of the 16 cases, seven gave a history of contact with a case of tuberculosis. There was history of cough in eight cases, lassitude in one, pain in the chest in two, loss of weight in three, night-sweats in eight, and dyspnœa in three. In only one case was there a history of the disease following an attack of measles, and in one it followed an attack of mumps. Here again the physical signs, although usually slight, were confined to the apex. In Dr. Agassiz's opinion it was inadvisable to rely on the report of the pure radiologist in these cases. The points in radiograms to which he paid particular attention were lack of translucency at the apex: increase of striation towards one apex as compared with its fellow; any marked increase of root shadows, especially if extending into the lung field; and any nodular appearance near the periphery, especially if associated with increased striation. In the more definite cases, the variations from the normal were usually quite apparent, and tended to support the view that these cases resembled the adult type of tuberculosis.

Dr. Agassiz thought the diagnosis of enlarged bronchial glands was too often made on insufficient evidence. Many signs had been described as characteristic, such as D'Espine's sign, parasternal and paravertebral dullness, and dilatation of the veins in the front of the chest. In his experience they were of little use. A radiogram might sometimes help in diagnosis of the condition, especially when the glands are caseous or calcareous and not merely swollen. Screening the chest in the oblique position had been said to be of value, but in his experience it had not been so.

The conditions chiefly involved in the differential diagnosis from pulmonary tuberculosis were non-tuberculous fibrosis of the lung; pleural effusion and empyema, either general or interlobar; generalised miliary tuberculosis; spontaneous pneumothorax; syphilis of the lung, which was probably much more common than was generally supposed; thickened pleura; and cysts and new growths. In almost all these conditions radiological examination would settle the question, while in empyema and pleural effusion the exploring needle would clinch the diagnosis. It was remarkable that in non-tuberculous fibrosis of the lung the radiogram showed little abnormality in comparison with the wealth of physical signs. The opposite was often true of tubercle. Enlarged tonsils and adenoids might cause impairment of the note and weakened breath sounds over one lung, but the radiogram appeared normal. Removal of the tonsils and adenoids would cause the abnormal signs to disappear.

"The Potentially Tuberculous Child."

Dr. W. BURTON WOOD (London) emphasised the unsatisfactory nature of the term, "potentially tuberculous child." Admittedly it was easier to obtain treatment for a delicate child by labelling it as pulmonary tuberculosis, but it was fairer to give the child the benefit of the doubt. The need for a careful revision of the whole subject had been brought home

to him by two investigations which he had carried out. The first concerned the condition of 50 children drawn from dispensaries and sanatoria, and admitted to Victoria Park Hospital for diagnosis. The clinician, the radiologist, and the pathologist in coöperation tried to determine whether a diagnosis of pulmonary tuberculosis was justified in each case. In only 40 per cent. was any evidence found of tuberculosis, either past or present, and in most of these it was at least doubtful whether tuberculosis was responsible for the malnutrition and debility which had suggested such a diagnosis. His second observation concerned 50 cases of adolescent and young adult phthisis in a sanatorium for women. The analysis showed that not one of the 50 had ever been in a children's sanatorium, and a clean bill of health in childhood was the rule. He concluded that at least half of the children attending the average tuberculosis dispensary are not suffering from tuberculosis at all, and that the "tuberculous seedling" was not the precursor of the adolescent consumptive.

Dr. Wood agreed with Dr. Agassiz about the existence in children of the adult type of phthisis, but he thought the cases were rare, only three or four being admitted to Victoria Park Hospital each year. He grouped with this type those cases of broncho-pneumonia with a "positive sputum." His second group of miliary tuberculosis of the lungs included cases of fatal miliary disease and also those rare cases in which recovery followed pulmonary tuberculosis of an apparently miliary distribution. In these tubercle bacilli were difficult to find, and diagnosis must depend on physical signs in conjunction with X ray evidence. He thought that there was justification in diagnosing lymphocytic pleural effusions as tuberculosis in spite of the fact that tubercle bacilli were very rarely found in the fluid. There were also cases of undoubted "juvenile infection," as shown by the calcareous nodes in the lungs and calcareous deposits in the root lymph glands. Dr. Wood admitted that the gap between primary infection in childhood as revealed by Ghon's foci and infected hilar glands and the subclavicular infiltrations typical of adolescent phthisis had not been bridged. The juvenile type of infection was only clearly recognisable in radiograms when calcification had occurred, and when danger, or, at any rate, immediate danger had passed.

In differential diagnosis exclusion must play an important part. We should consider defects of the gastro-intestinal system, infections of the upper air passages, notably the presence of enlarged tonsils and adenoids; rheumatic disease; and infections of the urinary tract—as, for example, *coli* bacilluria in small girls; syphilis of the lung; chronic pulmonary catarrh, including fibroid lung and bronchiectasis; and finally social causes for malnutrition were too often forgotten.

In summing up he thought that diagnosis and notification of pulmonary tuberculosis was justifiable: (1) When physical signs indicated disease of the adult type and T.B. were found in the sputum or fæces. Also when with signs of broncho-pneumonia T.B. were found. (2) When the signs and symptoms of miliary tuberculosis were confirmed by radiological evidence. (3) When pleurisy with effusion was present and was not due to any other demonstrable cause. He thought that those cases of suspected primary infection which gave a definite positive reaction with the Pirquet or Mantoux skin tests or possibly a positive complement-fixation reaction, together with signs of toxæmia not accounted for by other evident sources of infection, should not lightly be diagnosed as pulmonary tuberculosis. The open-air school and not the sanatorium was the place for the delicate child.

Clinical Features in Children.

Dr. B. E. SCHLESINGER (London) thought the adult type of phthisis in children was rare, and suggested that Dr. Agassiz's clinical material was somewhat concentrated, because it was largely these definite and selected cases which were treated in his sanatorium. As regards the diagnosis, repeated mild attacks of bronchitis might be the earliest sign, but they differed in no way from ordinary bronchitis, and it was only when the disease was anticipated or when tubercle bacilli were discovered in the sputum that the diagnosis could be made at this early stage. Close attention should be paid to the family history, since direct contact with active consumption in adults was the greatest source of danger to the child.

Dr. Schlesinger later referred to the question of tuberculous broncho-pneumonia and epi-tuberculosis. The first was not uncommon in childhood, whilst the second was a rare and peculiar variety first described by Eliasberg and Neuland in 1920. The important distinction between the two types was that tuberculous broncho-pneumonia was invariably fatal and epi-tuberculosis almost invariably followed by recovery. The chief manifestation of the latter was an extensive area of consolidation usually confined to the right upper lobe. This area was dull on percussion, and on auscultation the breath sounds were tubular although no adventitious sounds were heard. Chronicity was a characteristic feature of these lung changes and they had been known to persist for nearly a year. The condition had to be diagnosed from an ordinary unresolved pneumonia and from tuberculous broncho-pneumonia. The former usually followed an attack of acute pneumonia and frequently left some degree of fibrosis, whereas a patch of epi-tuberculosis cleared up completely without fibrosis and radiologically only some thickened glands were seen at the hila. Tuberculous broncho-pneumonia was almost always fatal. Some would doubt the existence of epi-tuberculosis, and cases which corresponded to Eliasberg and Neuland's original description were certainly exceedingly rare. The speaker had seen only two such cases.

Discussing the significance of tuberculin skin tests, Dr. Schlesinger said that subcutaneous injection of old tuberculin with its local, focal, and general reactions as a means of diagnosis could at once be dismissed as obsolete and harmful. Most valuable of the various tests was the Mantoux modification of the Pirquet reaction. It gave no indication of the activity of injection since it would be positive whether the foci of infection were active, latent, or healed, but a positive reaction was of greater diagnostic value in very young children who were less likely to have old tuberculous lesions. A negative reaction at any age was of great significance.

Discussion.

Dr. L. S. T. BURRELL (London) found himself in agreement with most of the points made by the speakers. About 20 years ago congenital syphilis was diagnosed as often as tuberculosis was now, and it was remarkable how well the children did on hydrarg. cum creta. He thought that there was not much distinction between a sanatorium and an open-air school; the important thing was that the mode of life should be regulated. He agreed that it was not the delicate child who became the consumptive adult. In regard to the question of hilum tuberculosis he instanced the work of Wingfield, who injected into guinea-pigs material from the hilum glands of children dying from varying causes and found that a large majority of them contained tubercle bacilli. A few tubercle bacilli in these glands did not seem to matter very much. Again, he thought that a positive tuberculin skin reaction indicated a certain degree of immunity. Tuberculosis leading to a fatal issue in children seemed to be rare, but tuberculosis in the infant was usually acute. At puberty the disease was much more deadly than at most other ages.

Dr. JANE WALKER (Nayland) pointed out that night sweats disappeared as soon as the patients were admitted to sanatorium. Apparently in their homes there were too many clothes on their bodies and beds. She asked if members of the Conference had noticed a weakening of faith in floods of fresh

air. She agreed with Dr. Agassiz, that there was a marked contrast between the radiographic and physical signs in non-tuberculous fibrosis of the lung.

Dr. GEORGE JESSEL (Lancashire) agreed with Dr. Burton Wood that the tuberculous child was not the precursor of the adolescent consumptive, and that in the diagnosis of intrathoracic tuberculosis common sense and not far-fetched physical signs were necessary.

Dr. ESTHER CARLING (Peppard Common) wished to know what was going to be done about the child wrongly diagnosed as tuberculous. All of them could not be sent to open-air schools, because these were only to be had in the large towns. In her opinion, delicate children should be treated in sanatoria without notification.

Dr. WARD was in accord with the prevalent view about the value of paravertebral dullness. From the practical point of view one need not wait for elaborate tests to be done before treating a delicate child.

Dr. W. C. FOWLER (Pinewood) thought that negative Pirquet cases should be treated rather than cases giving a positive reaction, which he regarded as an indication of protection against tuberculosis.

Dr. HERBERT said that the question of physical signs in enlarged mediastinal glands needed further investigation. Although he did not very often find paravertebral dullness in children's chests, one could not, he thought, arbitrarily dismiss the sign as valueless. The dullness might not be due to the actual presence of glands, but to some reflex irritation. Dr. A. I. G. McLaughlin and he were at present engaged in the analysis of a series of cases in order to estimate if possible the value of the various signs said to indicate the presence of enlarged mediastinal glands.

Dr. MARGARET SHARP (Bradford) and Dr. NIVEN ROBERTSON (Chesterfield) were both sceptical about the value of paravertebral dullness, and the latter thought the diagnosis of intrathoracic disease in children an extremely shady business, although he admitted that the use of lipiodol made a very pretty radiogram.

Dr. G. M. MAYBERRY (Dagenham) said that he had not heard the importance of temperatures in diagnosis emphasised as much as he would have liked, and drew attention to the number of cases of so-called tuberculosis cured by attention to the tonsils and adenoids.

Dr. PEARSON thought that there was a great difference to be observed in the incidence and type of tuberculosis in children between 1 and 4 years and after that period. He also stressed the value of taking rectal temperatures.

Dr. DICKINSON said that in his experience patients with bronchitis did not readily develop tuberculosis.

Dr. C. H. C. TOUSSAINT (London) stated that in a series of 60 cases labelled as tuberculosis in childhood he knew of only two who had developed true pulmonary tuberculosis in early adult life. It seemed that we might be compelled to change our views and direct more attention to the young adult contact who appeared to be in good health, but who might well be in the latent stages of pulmonary tuberculosis.

The question of tuberculosis in childhood was of great administrative importance. It seemed to be the unanimous opinion of the meeting that there had been gross over-diagnosis of the condition, and if this were so much money had been and more still was being wasted on treatment. In London difficulty was arising owing to the fact that the County Council had limited certain open-air schools to notified cases of tuberculosis. Dr. Toussaint considered this to be a great mistake.

[The report of the two remaining sessions is unavoidably held over. These dealt with III. The Correlation of X Ray Findings in Pulmonary Tuberculosis, and IV. Gas Poisoning and Gunshot Wounds of the Chest in relation to Tuberculosis.]

A NATIONAL CAMPAIGN AGAINST RHEUMATISM.

AT a meeting held in London at the house of the Royal Society of Medicine on June 26th, a new association having for its object an organised campaign against rheumatic diseases was inaugurated under the title of The National Association for Combating Rheumatism. Sir THOMAS HORDER took the chair.

Letters of approval and encouragement were received from Sir George Newman (Chief Medical Officer of the Ministry of Health) and others and were put before the meeting by Dr. M. B. RAY, the acting hon. secretary, who also read the proposed constitution and policy of the Association. This emphasised the great crippling effect of rheumatic diseases on a large section of the community, and the important part they were playing in the production of sickness and suffering. It was felt by those responsible for starting the campaign that it was high time to make a concerted effort to deal effectively with the problem in all its aspects. About one-sixth of the total invalidity of the country could be charged to diseases commonly classed as "rheumatic"; they were responsible for the loss of three million weeks of labour, and for the payment of about two million pounds in sick benefit annually. At present there were proper treatment facilities for only a minority of sufferers, and it was felt that, since the causes of these conditions were still obscure, adequate facilities for research as well as for treatment should be provided. In the forefront of the Association's policy was placed the need for educating medical opinion upon early diagnosis and the importance of continuous treatment. The public should be told of the value of further research, whilst efforts directed towards prevention were essential. A system of following up cases needed to be organised, and efficient home treatment should be carried out. Bound up with this was advice about suitability of occupation, in which employers of labour might well be invited to interest themselves. Climatic and occupational factors must be carefully studied, and research must not be confined to the laboratory. Coöperation was required between the laboratory worker, the clinician, the biochemist, and the radiologist, and social workers also should be interested in the campaign. It was hoped that a system of uniform reporting of results would be arrived at: this would certainly aid the collection of statistics, and enable the value of various forms of treatment to be assessed. Another proposal was the establishment of treatment centres.

Sir CLAUDE HILL (Governor of the Isle of Man) formally moved that the Association adopt the proposed constitution and policy, and said that he was much impressed by the scope of the campaign now being undertaken. He hoped industrial interests would be successfully enlisted, and especially that clinics in different parts of the country would be established for dealing with these diseases. He also suggested that the organising secretary should be a man who would be able to travel, so as to ensure the sympathy of the industrialists, and persuade them that their support was needed. The Association, on the suggested lines, would be in a good position to meet what everyone cognisant of the facts would feel to be a real need.

Dr. MALCOLM CAMPBELL (Droitwich) seconded the resolution, and mentioned the great aid in the movement which could be afforded by the various women's organisations.

The CHAIRMAN agreed about the desirability of a close liaison between the industrial and the purely medical aspects of the problem, and said this had been in the minds of the Committee from the start. He mentioned that the Prime Minister had signified his willingness to become a member of the Council.

Mr. HENRY LESSER (President of the National Association of Insurance Committees) moved the

acceptance of a list of 74 ladies and gentlemen proposed as members of the Council.

Dr. E. I. SPRIGGS, in seconding, said that in discussing this matter with people and trying to get their help he had found it useful to point out that this was not a charitable appeal. Though rheumatism affected certain classes, no social grade was exempt. It was not proposed to start a new organisation which should replace or absorb any in existence, but one which should coöperate with other bodies for the prevention and adequate treatment of rheumatism. Much good work was already being done and it was "bad business" to have it done in different places separately.

The list of names was then accepted by the meeting.

Dr. FORTESCUE FOX emphasised the need of enlisting all who could help this important movement forward, and hoped that the international aspect would be borne in mind. Good work in this connexion was going on in other European countries.

Dr. J. VAN BREEMEN (Amsterdam), speaking as hon. secretary of the Ligue Internationale contre le Rheumatisme, referred to the Ligue's meeting to be held in October at Budapest, at which ten nations were already represented. Among points on which information from all sources would be welcomed were: the relation between acute and chronic rheumatism and the significance of serological and blood examinations. It would be a great help to receive for consideration at the Congress information and suggestions from England.

SCOTLAND.

(FROM OUR OWN CORRESPONDENTS.)

The Water-supply.

THE amounts of water in the Edinburgh reservoir are still extremely low and the Water Committee find it necessary to issue another warning. It is suggested that the consumers should aim at saving 2 gallons a day, which in the population supplied in the Edinburgh area would mean a saving of 1,000,000 gallons daily or 30,000,000 gallons a month. It was pointed out by the engineer that the use of water for flushing the drains and sewers is not wasteful but a necessary health provision, and the amount so used is comparatively small. The aqueduct from the Talla reservoir is being duplicated; but the duplication cannot be finished in time to relieve the situation this year. The manager of the Glasgow Water Department says that earlier in the year there was some anxiety, but at present there is an assured supply for four months. The notices posted in the tramcars some time ago calling upon the citizens to conserve the supply as much as possible seem to have had an effect.

Finances of Edinburgh University.

At a recent meeting of the University Court Sir Alfred Ewing, the Principal, said that the ordinary revenue had increased from £110,000 in 1913–14 to nearly £250,000 in 1927–28, and in the current session it would probably be £254,000. In these figures no account is taken of scholarships or bursaries for which the University is only a trustee. Of the whole regular income, about £48,000 comes as interest from endowments, Parliamentary grants amount to £91,800, and £107,000 is paid in fees. The ordinary revenue includes also about £6000 in donations and subscriptions (apart from capital donations), and in payments by local authorities for services rendered. Of disbursements the salaries of the teaching staff constitute the heaviest item—about £141,000. Pensions and contributions to the federated superannuation scheme account for £15,000; wages and grants to departments for expenses require £25,000, and libraries and museums about £9000. The cost of administration, including the salaries of the Principal and of members of the secretarial staff, is about £18,000. Some £30,000 is required for maintenance of premises, and £10,000 for alteration and adaptation of buildings, and for certain apparatus and equipment. The whole expenditure charged to the ordinary account for 1927–28 was about £253,000, leaving a deficit on the year's working of £3490. For the current year the estimated deficit is £4676, and is likely to be more. Sir Alfred pointed out that enlargement of the University, in respect of buildings, subjects, and staff, cannot fail to increase the annual charges that fall on ordinary revenue. As a rule, the increase in revenue from fees arising from a new development does not compensate for the increase in annual charges. Hence new sources of revenue must be found. It is for consideration whether, in the disposal of future capital grants from the Carnegie Trust, the trustees should not be invited to consider the wisdom of giving some relief from the increasing burden of maintenance, by granting sums for the better endowment of existing professorships and lectureships, whose value is established, but whose cost is now a burden on the general funds. The bequests and gifts which have made the expansion of the University possible have amounted to over £1,174,000 since 1916. Fully half of this has been invested to provide endowments for particular or general purposes, whilst the remainder has been or is being applied to various extensions of premises and work, including provision for an extensive and much-needed reconstruction of the Medical School.

An Auxiliary Hospital in the Country.

The Auxiliary Hospital of the Victoria Infirmary, Glasgow, at Philipshill, near Busby, was formally opened on June 27th. Beautifully situated in rural scenery, the grounds of the extension cover some 33 acres, and two of the eight pavilions which will ultimately be in use are now completed. It will serve as a convalescent hospital where patients, having passed the stage for constant medical and surgical attention, can be transferred to convalesce, and thereby release beds for the long list of sufferers awaiting admission to the infirmary.

Mr. William Gray, who presided, said that the natural evolution of hospital treatment seemed to demand that buildings in the cities should be regarded as clearing-houses for cases in the acute stage; when that stage had been passed the patients should be placed in brighter and more attractive surroundings than the ward of a city hospital. They would not have been able to proceed with the work if Mr. Gilchrist Macbeth had not offered to contribute £20,000 if it was undertaken. Miss Innes had contributed £13,000 for the building of a chapel and to defray the cost of a ward.

Major Walter Elliot, M.P., late Under Secretary of State for Scotland, who gave an address on the general hospital problem, spoke of the damaging effect of urban noise on minds and tempers. If this problem could not be solved for the healthy, let an attempt at least be made to solve it for the sick. Glasgow was on the verge of a further expansion and the governors of the hospital were to be commended for having got a little ahead of the procession which would shortly follow out of the city. Such expansion had been in the mind of the late administration in considering Scottish local government and the relation between the voluntary, city, and parish hospitals. Not only had the hospitals of Glasgow to be treated as a unit, but extensions outside the area had to be recognised as part of the system. The decision that public hospitals should be under one health authority meant that its relations with the voluntary hospitals must be closer than before, and by submission of local reorganisation schemes to the Department of Health it was hoped that overlapping might be avoided. He was certain that they could always look to the central department and to the present Secretary of State for Scotland for sound reasoned judgment on these great matters.

Appointments in Forfar.

Dr. J. A. Lowson, Provost of Forfar, and Dr. N. J. Sinclair, medical officer for the county of Angus, have been given commissions as Honorary Sheriff-Substitutes at Forfar Sheriff Court. Dr. Lowson, who is a native of Forfar, studied medicine at Edinburgh. He went abroad, and lived for many years in China and India. On returning to Scotland he entered the town council in 1905, and since then has been zealous in public work. He is a manager of Forfar Infirmary, and a justice of the peace. Dr. Sinclair is a graduate of Aberdeen. For about ten years he practised in Brechin, and 20 years ago was appointed medical officer for the county.

NOTES FROM INDIA.

(FROM OUR OWN CORRESPONDENT.)

Cholera in Bengal.

THE epidemic in Calcutta has reached more serious dimensions this year than in 1928. During the week ended May 11th 172 deaths were reported; in the preceding two weeks the death roll was 159 and 109 respectively; the maximum weekly figure in 1928 was 126. There is considerable evidence that many of the water mains are defective, nor is this to be wondered at when it is remembered that many of them are 50 to 60 years old. The prevalence of sediment during the dry months shows that the failure to keep up the pressure during the off-hours results in the suction of sewage into the mains. The provision of beds for cholera cases in Calcutta hospitals is inadequate and the health officer is unable, owing to shortage of inspectors, to exercise adequate control of markets and shops. The water-supply, however, has been chlorinated and mass inoculation is being organised.

The situation of a busy medical officer faced with a virulent outbreak of cholera is not an enviable one. The disease may, and often does, single out some remote village, far away from hospital facilities, and in a day all ordinary means of treatment may be exhausted. Under such conditions it is useless to talk of saline injections for a whole countryside, and any simple measures which are likely to prove effectual may be invaluable. Dr. J. W. Tomb has contrasted the results of various forms of treatment, as compared with cases untreated, in epidemics occurring in the Asansol Mining Settlement during the years 1922 to 1928. A rough clinical diagnosis based on the four cardinal symptoms of diarrhœa, vomiting, cramps, and suppression of urine was accepted in most cases, though in a considerable number it was supported by bacteriological examination; cases characterised by collapse were classified separately. The results of 2826 treated and 398 untreated cases are given under the headings of "cholera mixtures," "saline injections," "homœopathy," "essential oils mixture," and "untreated" respectively. Dr. Tomb comments on the good results which apparently followed homœopathic treatment, which he attributes partly to suggestion, partly to the fact that the common homœopathic remedy in the Settlement consists of spirits of camphor. Essential oils seem to have had the advantage over injections in the non-collapsed cases, while in the collapsed the effect was almost identical. It seems clear that there is a solid foundation for the reputation which the essential oils have obtained in many different places, and that they may be profitably employed either alone, or, where possible, as Dr. Tomb recommends, always in collapsed cases, in association with saline injections. One great advantage they possess is extreme portability.

Radium Institute at Patna.

In its seventh year of existence this Institute is still the only place in India where any considerable quantity of radium exists. Although a certain amount of radium is now available in some of the bigger centres, patients still continue to come to Patna from all parts of India and even from Burma and Ceylon. The Institute, which used to be at Ranchi, is now situated in the compound of the general hospital attached to the medical college at Patna, which trains students for the University degrees. Facilities exist here for securing every kind of specialist help when necessary. It will now be possible to teach students the use and value of this important therapeutic agent.

Workmen's Compensation.

Prior to 1923, in India, it was impossible for a workman to recover damages except when the employer was liable at Common Law for his personal negligence, and a deceased workman's dependants could only claim damages under the Indian Fatal Accidents Act of 1855 if the accident which caused the death was due to similar causes. But, profiting by the experience of countries in the West, India was able to introduce in 1923, at a single step, a practical piece of legislation providing for payment of compensation for industrial accidents. The Act, which came into force in India on July 1st, 1924, extends to the whole of British India, including Baluchistan and the Sonthal Parganas, which form a small district in Bihar and Orissa. Thus it does not apply to Indian States, but only to those parts of India which are under direct administration. The Act was subsequently extended to the Northern and Southern Shan States of Burma, Aden, the Military Cantonment of Bangalore, and the Andaman Islands. One Indian State, Mysore, has followed the lead of British India in this respect in introducing a similar piece of legislation this year. Thus the Act still remains limited in extent. It is also limited in scope, for it applies only to workmen in hazardous and organised industries. Owing to the peculiar conditions of India, it was not possible to include all classes of manual labourers; this would have introduced immeasurable difficulties in administration, especially, for example, in agriculture. The tendency in workmen's compensation legislation throughout the world is, however, to extend its protection to all manual labourers, but it may be many years before the Act in India can be so extended.

Women's Medical Service.

The difficulties experienced in providing well-qualified women doctors for hospitals in India without increased aid from Imperial revenues are revealed in the annual report for 1928 of the Committee of the Countess of Dufferin Fund. This year was a disappointment as far as the supply of first-class medical women through the Women's Medical Service was concerned. The Government of India's refusal to raise the annual subsidy to Rs. 5,00,000—which sum would have been sufficient to increase the cadre of the Service to 50—was followed by a further refusal to give even temporary help so as to obviate the necessity of cutting down the sanctioned posts until such time as Provincial grants were obtained. The Committee of the Fund was, therefore, reluctantly obliged to refrain from filling two vacancies in the cadre occurring during this year and to withdraw the Service doctor from the Women's Hospital at Hyderabad, Sind. This post was selected for reduction because inspection showed that the hospital was receiving little local support, while the minimum appliances and staff for efficient work were not being supplied by its committee. Further withdrawals will be necessary if support from the Provinces is not received, and the doctors removed will be from hospitals in those provinces which do not pay towards the services of their Women Medical Service doctors.

Another disappointment was the refusal of the Rockefeller Foundation to give any grant towards the research work on maternal and infant mortality which Dr. Balfour is pursuing at the Haffkine Institute in Bombay; but this has been mitigated by the response to Lady Irwin's personal appeal to wives of Governors for help in this all-India work.

Vaccination in the Punjab.

The experience of a well-vaccinated Indian province gives food for thought. The Punjab is evidently particularly fortunate in this respect, and the report of the Director of Public Health for 1927–28 furnishes ample evidence, if that were needed, of the good results. Continued progress is shown in the increase of 50,294 in the number of vaccinations performed during the year over the total of 1,242,090 in the previous year. The value of vaccination is now so generally accepted throughout the province that the annual reports can be expected to contain little that is new, apart from detailed improvements in the machinery of the department, and any necessary increases in the district staffs. Stress is laid, however, on the necessity of keeping a watchful eye on the inhabitants of remote areas; an epidemic occurring last year, in a hill tract over which the Punjab Government had no control, constituted a serious menace to the neighbouring British territory. Another source of danger is the survival of the old practice of inoculation, still widely prevalent in Persia and occasionally done surreptitiously in the Punjab. The district of Montgomery furnishes a salutary warning in the significant fact that with the lowest number of vaccinations in the past five years it combines the highest small-pox record. An Act has now been passed which will enable district boards as well as municipal committees to extend compulsory vaccination to areas under their control, and a start has been made in employing female vaccinators for purdah ladies—a very useful innovation.

Health Schools.

The success of the health school movement in India is emphasised in the report of the Lady Chelmsford All-India League. The training of the workers, says this report, is vital if child welfare work in India is to be continued on an efficient basis, and there are signs that this is being realised to a greater extent than heretofore. A new school has been opened in Lucknow under the auspices of the United Provinces Branch of the League, and the school at Madras is about to be recognised and made more efficient. It is very desirable for all health schools to have as far as possible a similar curriculum and similar standards. Only thus will the standard of the work be maintained throughout India.

POST-VACCINAL ENCEPHALO-MYELITIS.

PROF. TURNBULL'S REPORT TO THE CORONER.

AT the resumed inquest on the body of a girl, aged 14, who died on June 11th, being the 28th day after vaccination, Dr. R. L. Guthrie, coroner for the Eastern District of the County of London, read a report supplied at his request by Prof. H. M. Turnbull, director of the Bernhard Baron Institute of Pathology at the London Hospital.

I have, said Prof. Turnbull, made a microscopic examination of the brain and the spinal cord, and have found the changes which are characteristic of "post-vaccinal encephalo-myelitis." No other cause of death was found at the post-mortem examination. Post-vaccinal encephalo-myelitis is a particular kind of inflammation of the brain and spinal cord which very rarely follows vaccination.

Cause.

Post-vaccinal encephalo-myelitis, he continued, is now acknowledged everywhere to be definitely connected in some way with vaccination. This connexion was first shown in the London Hospital in 1922. It was then recognised in Holland in 1924. Since then the disease has been found in almost every country. I do not consider that it is a new disease, though it appears to have become more common. My attention was first drawn to the condition by finding the peculiar microscopic changes in a recently vaccinated boy in 1912. As soon as the disease was known, doctors remembered seeing similar cases in their practice in former years. Sacco, a hundred years ago, referred to nervous accidents consequent upon vaccination.

It has been proved that the disease is not due to any particular vaccinal lymph, and that it is not caused by any fault in the preparation of the lymph, or any contamination of the lymph, or any mistake in the technique previously recommended officially to doctors when vaccinating a patient.

The exact cause has not yet been discovered. Some consider that the disease is due to the vaccinal lymph itself acting upon persons who are abnormally sensitive to it. Most investigators believe that the vaccinal lymph lights up an infection which is lying dormant in the patient. The latter view has some support in the observation that a very similar inflammation may complicate measles, possibly other exanthemata, and antirabic treatment. But the nature of this supposed dormant infection has not been established.

Almost all authorities are agreed that the disease has nothing to do with "sleepy sickness" (epidemic encephalitis or encephalitis lethargica) or infantile paralysis (acute poliomyelitis).

Incubation Period.

The illness is usually definite on the 10th to 13th day after vaccination. It may begin earlier or a little later. It has never begun months or years after vaccination.

Incidence.

When all vaccinations are taken into consideration this complication of vaccination is extremely rare. I cannot obtain exact figures, but according to the Report of the Committee on Vaccination, Ministry of Health, 1928, there were 62 cases between October, 1922, and December, 1923, inclusive; during this period 1,048,000 tubes of lymph were issued. Very few of these 62 cases were proved by microscopic examination. At the very most, therefore, there was 1 case in 16,903 vaccinations.

The disease occurs in infants (one of my series was an infant of three months), children, and adults (my oldest was aged 22 years, but a patient of 50 years is included in the Report of the Committee on Vaccination). It is, however, relatively rare in infants under one year. Thus, in Holland from 1924 to 1926 a very exceptional number of cases occurred, but among 27,405 infants under one year of age who were vaccinated only 1 was affected (Report of Committee on Vaccination, 1928).

The great majority of patients have not been vaccinated before. There was a history of previous vaccination in one of my cases, but in this case (as in all my others) there were no scars of previously successful vaccination. I have not found in the literature at my disposal a definite record of the occurrence of post-vaccinal encephalitis after a previous vaccination which "took."

About half of those affected die (Report of Committee on Vaccination, 1928, 55 per cent.) but it is very important to point out that the remainder not only recover, but with few exceptions recover completely.

Methods of Vaccination.

The Commission on Vaccination (1928) recommends (p. 201)—but apparently there has been no official order—that "(1) In place of the officially advocated four insertions trial be made of vaccination and revaccination in one insertion with a minimum of trauma, and that multiple scarification and/or cross-hatching be deprecated. (2) Primary vaccination be performed in infancy, between the ages of two and six months at present; and that revaccination be offered at the time when a child enters school (5 to 7 years) and again on leaving (14 to 16 years)."

Dilution of vaccinal lymph, Prof. Turnbull concluded, is recommended and practised in the London Hospital by Dr. Bedson, but such dilution can only be made by a very few men of very special training.

EPSOM COLLEGE.

THE annual general meeting of the Governors of Epsom College was held on Friday, June 28th, at the Office, 49, Bedford-square, W.C., when the Chairman of the Council, Dr. Raymond Crawfurd, presided.

The report of the scrutineers showed that the following were the successful candidates for pensionships and foundation scholarships:—

Pensionerships.

	Votes.		Votes.
*Mylan, Dr. James G. ..	6723	‡Alford, Mrs. Mary A...	5417
*Johnstone, Dr. George W.	5936	†Benson, Dr. Alfred ..	4897
*Ogilvy-Ramsay, Mrs. Isabella	5673	‡Harris, Dr. Arthur G. R.	4584

* Ordinary Pensioners. † Highett Pensioner.
‡ Burney Yeo Pensioners.

Foundation Scholarships.

Porter, John D. .. .. 21,027 | Hogg, Robert D. .. 13,926

In proposing the adoption of the report and the income and expenditure account, the Chairman expressed the Council's regret that three warm friends of the College had died since the last annual general meeting—namely, Lord Rosebery, who was President, Dr. Francis de Havilland Hall, who was a Vice-President and for some time acted as Vice-Chairman of the Council, and Mr. Æneas Mackay, who was a member of the Council. Dr. Crawfurd stated that the sum of money required for the new sanatorium was not increasing as rapidly as the Council would wish, and he urged all friends of the College to procure donations for this special purpose. He added that if two sums of £5000 could be obtained the work would be started at once. In reference to the school, he said that progress was being made in all directions, and that the Council had brought into force a much improved scale of salaries and emoluments for assistant masters, and this had been greatly appreciated. The Council had received with great pleasure a sum of £1000 which Lord Beaverbrook had placed at the disposal of Mr. Stanley Baldwin in gratitude for his escape, as well as the escape of his associates, in a motor accident. This generous gift was being expended on the furtherance of scientific education at the College.

The report submitted to the Governors showed that since the last annual general meeting an open entrance scholarship of £100 per annum in classics at Pembroke College, Oxford, had been won by E. V. E. White. Eighteen candidates entered for the first examination for medical degrees, as follows:—London, 11 candidates, of whom 4 were completely successful, 5 were successful in two subjects out of three and 1 was successful in one subject out of three; Oxford, 2 candidates, both of whom were completely successful; and Cambridge, 5 candidates, 4 of whom were successful in all subjects, and 1 was successful in one subject. Sixteen candidates presented themselves for the University of London higher certificate, of whom 6 were completely successful and 8 were partially successful, whilst 8 candidates out of 12 were successful at the University of London matriculation examination. Of 87 boys who presented themselves for the University of London general school examination, 76 gained school certificates, 8 with honours, of whom 42 gained exemption from matriculation. Thirty-three boys obtained the War Office certificate "A"; out of 3 candidates for the Royal Military College, Sandhurst, 2 were successful, gaining 3rd and 70th places; and 1 boy was successful for the Royal Navy paymaster cadetship, taking the 6th place. The report further stated that A. L. Novis had been awarded his "cap" for England, being the second Old Epsomian to win his Rugby international during the last two years; W. J. Leaning had been elected captain of the Oxford University boxing team, and D. L. Rhys had represented Sandhurst in cricket, boxing, and fencing.

The Governors were able to elect only nine members of the Council to serve for a further period of three years, instead of ten as prescribed by the Act of Incorporation, owing to the death of one of the candidates, and it was decided to adjourn the meeting until Friday, July 26th, when a tenth member would be elected.

ELECTION OF DIRECT REPRESENTATIVES FOR THE DENTAL BOARD OF THE UNITED KINGDOM.

THE second election of direct representatives for the Dental Board of the United Kingdom took place last month, the votes being counted on June 17th–19th.

(*a*) *Qualified Dentists Practising in England and Wales* (*2 Seats*).

Four candidates were nominated—namely: Mr. W. R. Ackland, L.D.S., M.R.C.S.; Mr. W. H. Dolamore, L.D.S., M.R.C.S.; Mr. W. H. Gilmour, L.D.S.; and Mr. C. F. Rilot, L.D.S., M.R.C.S.

The number of voting papers issued was 5926; deducting dead letters (20) the possible number of voters was 5906; good votes numbered 3207; invalid votes (the larger part on account of failure to sign the identification envelope) 364, and 2335 took no part in the election.

The voting papers were sorted according to the first choices, and then, as the voting for the third place was seen to be so close, a further count was taken. The result was as follows: Ackland, 828; Dolamore, 1032; Gilmour, 679; Rilot, 668; total, 3207. The quota (one more than a third of the whole) was 1070. As no one had obtained the quota Mr. Rilot, having received the least number of votes, was declared defeated, and his votes transferred to the second choices shown on his papers. This produced the following result: Ackland, 925; Dolamore, 1509; Gilmour, 763; non-transferable, 10; total, 3207.

Mr. Dolamore had now obtained the quota, and he was declared to be elected, his surplus votes (439) being transferred to the candidate marked 2 on his papers in such a manner that each received his proper proportion. The result was shown to be: Ackland, 1056; Gilmour, 874; non-transferable, 207; retained for Dolamore's quota, 1070; total, 3207. Mr. Ackland was therefore declared to be elected.

No. of valid votes, 3207. No. of members to be elected, 2.

$$\text{Quota} = \frac{3207}{3} + 1 = 1070.$$

Names of candidates.	First count.	Second count.		Third count.	
	Votes polled by each candidate.	Transfer of Rilot's votes.	Result.	Transfer of Dolamore's surplus.	Result.
ACKLAND ..	828	+ 97	925	+131	1056
DOLAMORE ..	1032	+477	1509	—439	1070
Gilmour.. ..	679	+ 84	763	+111	874
Rilot	668	—668	—	—	—
Non-transferable papers ..	—	+ 10	10	+197	207
Totals.. ..	3207	—	3207	—	3207

(*b*) *Qualified Dentists Practising in Scotland* (*1 Seat*).

Two candidates were nominated—namely: Mr. W. Guy, L.D.S., F.R.C.S., and Mr. J. W. A. McGowan, L.D.S.

The number of voting papers issued was 925; deducting dead letters (5) the possible number of voters was 920; good votes numbered 660, invalid votes 60, and 200 took no part in the election.

The result was as follows: McGowan (elected), 391; Guy, 269.

(*c*) *Qualified Dentists Practising in Ireland* (*1 Seat*).

Two candidates were nominated—namely: Mr. J. Malone, L.D.S., and Mr. E. L. Sheridan, L.D.S., F.R.C.S.

The number of voting papers issued was 296 and there were no dead letters; good votes numbered 196, invalid votes 13, and 87 took no part in the election. The result was as follows: Sheridan (elected), 124; Malone 72.

(*d*) *Dentists, 1921* (*2 Seats*).

Four candidates were nominated—namely: Mr. W. F. Bowen (Bolton), Mr. F. Butterfield (Lytham, Lancs.); Mr. A. H. Condry (Birmingham), and Mr. W. L. Edwards (Gloucester).

The number of voting papers issued was 7222; deducting dead letters (16) the possible number of voters was 7206; good votes numbered 3787 (4478); invalid votes (the larger part again on account of failure to sign the identification envelope) 390, and 3029 took no part in the election.

The voting papers were sorted according to the first choices, the result being as follows: Bowen, 855; Butterfield, 1820; Condry, 281; Edwards, 831. The quota (one more than a third of the whole) was 1263.

Mr. Butterfield, having obtained more than the quota, was declared to be elected, and his surplus votes (557) were transferred to the second choices. For this purpose all Mr. Butterfield's papers were re-examined, counted, and transferred in such a way that each candidate named as a second choice received the same proportionate share.

The result after the transfer of Mr. Butterfield's surplus was: Bowen, 1159; Condry, 419; Edwards, 946; quota retained for Butterfield, 1263; total, 3787.

As none of the other candidates had yet obtained the quota Condry was declared defeated and his votes transferred according to the preference, where expressed, to Bowen or Edwards. The result of this transfer was: Bowen, 1355; Edwards, 1117; non-transferable, 52; quota retained for Butterfield, 1263; total 3787. Mr. Bowen was therefore declared to be elected.

No. of valid votes, 3787. No. of members to be elected, 2.

$$\text{Quota} = \frac{3787}{3} + 1 = 1263.$$

Names of candidates.	First count.	Second count.		Third count.	
	Votes polled by each candidate.	Transfer of Butterfield's surplus.	Result.	Transfer of Condry's votes.	Result.
BOWEN	855	+304	1159	+196	1355
BUTTERFIELD ..	1820	—557	1263	—	1263
Condry	281	+138	419	—419	—
Edwards ..	831	+115	946	+171	1117
Non-transferable papers ..	—	—	—	+52	52
Totals.. ..	3787	—	3787	—	3787

Comments.

The total percentage of the electorate who took part in the election was 60·55 per cent., as compared with 64·49 in 1924. It was shown in this election, as in 1924, that it is not good policy to refrain from recording the order of preference for all the candidates. Those who recorded only their first choice took no part in the election of the candidate when it came to taking further counts, and their papers merely became "non-transferable." The sorting and counting of votes, and the necessary calculations were carried out under the direction of Mr. A. J. Gray, of the Proportional Representation Society.

Correspondence.

"Audi alteram partem."

THE MECHANISM OF FILARIAL PERIODICITY.

To the Editor of THE LANCET.

SIR,—The thoughtful and stimulating article by Colonel Clayton Lane on the mechanism of filarial periodicity in your issue of June 22nd has once more raised interest, at a most appropriate time, in this mysterious phenomenon. As Colonel Lane has done me honour by frequently referring to my own contributions on the subject (made some 17 years ago), I have thought it appropriate that I should set down some of my own views. There is nothing that I regret so much in my work on filariasis in Fiji that, apart from making certain observations on the lack of periodicity of the Fijian microfilaria and tracing its development in its appropriate intermediary host, I was unable to finally determine the exact mechanism of periodicity, except to assume (as had Manson in his original discovery) that this habit was an adaptation to the peculiarities of the mosquito host. This conclusion, which at that time appeared tenable on purely biological grounds, is not, as Colonel Lane has shown, so simple as it at first sight appeared to be. Colonel Lane sums up in favour of simultaneous cyclical parturition on the part of the female filaria as the cause of periodicity—that is to say, he assumes that in the case of the nocturnal *F. bancrofti*, the embryos are emitted by the parent worm into the blood stream during the night time, while in the non-periodic *F. bancrofti*, of Fiji and of Oceania in general, the embryos filter into the blood during the whole of the 24 hours, and that daily enormous numbers of microfilariæ are destroyed in and disposed of by the human body. In order that this supposition should fit in with the facts so far as they are known, we must credit each female *F. bancrofti* with extensive powers of fecundity. It is the only explanation at present forthcoming which will even roughly correspond with the known facts; but in order to explain the very large numbers of microfilariæ which may be found in the peripheral circulation of an individual, it is necessary to know the total volume of blood in the peripheral circulation on the surface of the body to which microfilariæ have access. This is an extremely difficult matter to ascertain accurately, and, even if we can do so roughly, there remains the uncertainty of the proportion of microfilariæ in the larger blood vessels.

As Fülleborn[1] states, it is readily understood that microfilariæ are held up in the smaller terminal capillaries, especially during their periodic appearances, but that they are more generally distributed throughout the larger arteries and veins also appears probable. Mackenzie and others have attempted to reckon out the total numbers of microfilariæ present in the blood of an average infected case as 40 to 50 millions, but these are mere guesses. I have had the assistance of Dr. W. K. Blackie in endeavouring to calculate out the amount of blood present in the peripheral circulation of an adult, 6 ft. in height, of 11 st. 6 lb. 12 oz. in weight, and with a surface area of 1·9 square metres. Assuming the blood volume to be 5 litres, the amount in the peripheral circulation would be 263 c.cm. I have frequently recorded in my work in Fiji counts of over 500 microfilariæ to every 20 c.mm. of blood, or one microfilariæ to every 20,000 red blood corpuscles. On this basis of reckoning, in the skin and subcutaneous tissue to a depth of 2 mm., there are contained no less than 6,575,000 microfilariæ. I have no means of ascertaining accurately the number of fecund and mature

[1] Fülleborn, F.: Filariosen des Menschen, Hand. d. Path. Mikro-org., 1929, p. 1103.

F. bancrofti present in a filariated individual at the one time. From such autopsies as I have been able to perform I should not place it at a figure higher than 20, which, if the periodic daily destruction of microfilariæ takes place, would credit a single female *F. bancrofti* with the power of producing some 328,000 embryos daily. Whether this is possible or not I do not think we are in a position to say. That certain helminths are prodigal in their reproductive capacity is well known, but I doubt whether there are any figures of the reproductive capacity in nematodes which would compare with these. As Clayton Lane suggests, some method of comparison might be obtained by a more minute study of allied species, such as the filariæ of birds of which the adults can be found and counted with greater certainty in the body than can the human species. Once only have I had the opportunity of watching the female *F. bancrofti* in the act of parturition, and this was, of course, under artificial conditions in a watch-glass in normal saline solution. The embryos emerged from the vulva in an unending stream, but it was impossible at the time for me to even estimate their numbers. I have hitherto hesitated in accepting the cyclical parturition theory, mainly on account of the only properly conducted experiments on the longevity of microfilariæ in the blood which were carried out by Fülleborn and which placed the life span of microfilaria repens of the dog, apart from the adult, at about two years. It may be, as Colonel Lane suggests, there was some flaw which vitiated the experiment. If his supposition of the daily destruction of millions of microfilariæ in the human body is correct, there must be some method of the disposal of their remains. One would expect that some evident pathological lesions would be produced. But this does not appear to be so. The fact remains that, from a clinical standpoint, those individuals with the highest microfilariæ count show fewest signs of what is generally understood as filarial disease. On Clayton Lane's hypothesis this would really indicate that the parent filariæ are located in some situation favourable to the uninterrupted passage of microfilariæ into the blood stream.

How can this question be determined? As far as is at present known there is no experimental animal in whose blood microfilaria bancrofti can survive. There only remains man himself, so that I would suggest that no great difficulty should be experienced in injecting a sufficient number of live M. bancrofti into a suitable volunteer in this country, so that by these means its life span could be determined and the conditions of Fülleborn's experiment reproduced. On the analogy of the embryos of other parasitic helminths it would be unbiological for the life span of microfilariæ in the blood stream to be a long one.

My mind is somewhat exercised to know how to fit in all the known facts with the theory of cyclical parturition. Let us recapitulate what they are: there are two varieties of *F. bancrofti* in man, morphologically indistinguishable from one another, each possessing a distinct geographical distribution, producing identical embryos, one with nocturnal periodicity, the other exhibiting no periodicity, developing in different species of mosquito intermediary hosts, and maintaining a different habitat in the human body. The latter is a point upon which insufficient emphasis has been laid. In the nocturnal *F. bancrofti* infections, the adults appear to live in the main lymphatic trunks in the neighbourhood of the thoracic duct, whence, presumably, they can pour an uninterrupted stream of embryos into the blood stream; in other words, they maintain a central location. Hence manifestations of disease brought about by lymphatic obstruction of the main trunk, such as chyluria, are associated with the nocturnally periodic *F. bancrofti*. On the other hand, the non-periodic *F. bancrofti* of Oceania inhabits the lymphatic glands, epididymis, tunica vaginalis, and perhaps the organs of the body. *It maintains a peripheral distribution.* Hence the filarial diseases produced are mainly those of enlarged lymphatic glands and the obstruction they give rise to. Chyluria is *completely* absent and elephantiasis of the forearm, extremely rare in other regions, is common and is due to the infestation of the epitrochlear glands by adult filariæ. How would this fit in with the theory of cyclical parturition? I can conceive that it does so by the fact that the embryos produced in the substance of the lymphatic glands have a much more complicated and circuitous route to pursue before they reach the blood stream which they enter by a constant trickle and thence appear in the peripheral blood capillaries in equal numbers both by day and by night. The next question which naturally arises is, how can one reconcile cyclical parturition with the inversion of periodicity in the nocturnal *F. bancrofti* by altering the sleeping habits of the host, as first shown by Mackenzie and afterwards confirmed by Manson? This is only explicable by the supposition that there is some substance in the blood of the sleeping host which has a stimulating effect upon the reproductive organs of the female parturient filaria. But how can that be reconciled with the diametrically opposite case of the diurnal *Loa loa* in which the embryos appear in the same vast numbers in the peripheral blood stream during the hours of daylight? Are we to suppose that in this instance this hypothetical chemical stimulant has the opposite effect? And how is it that the periodicity of the diurnal microfilaria loa cannot be (easily at any rate) upset, though as Külz has demonstrated,[2] this upset of periodicity during the voyage from West Africa to North America actually takes place?

Another difficulty I find in envisaging the entry of the microfilaria loa into the blood stream. How exactly is this brought about, except through the lymph channels? As far as we know, the adults of *Loa loa* live in the connective tissues, but the parturient female must have direct access to the lymph stream before her embryos can enter the blood. Again, in connexion with this last parasite: how can we reconcile the remarkable observations made by Manson and confirmed by myself that subsequent to the date of known infection by *Loa loa* a period of six to seven years may elapse before the entrance of the embryos into the blood takes place. It is inconceivable that it is necessary for this long period before the adult *Loa loa* becomes mature. Rather may we explain it on the supposition that the female or females of *Loa loa* find themselves in a position from which the embryos are unable to find their way into the blood, and it is while they are searching for a suitable breeding ground that they emit the embryos into the connective tissues and cause those curious "Calabar swellings," which may be said to resemble the lesions brought about by the infelicitous discharge of guinea-worm embryos into the body. I would therefore appeal for future study to be directed towards solving these crucial questions by a reconsideration of the mechanism of periodicity on a wider scale, by carefully weighing in the balance all the evidence which has been collected, not on the life-history of *F. bancrofti* alone, but also upon other human species.

Since my work on filariasis in Fiji and Ceylon has been completed I have had few opportunities of continuing observations on periodicity. I was, however, able in 1925 to confirm the observations of Külz that capillary constriction causes no diminution in the number of circulating microfilariæ (*Loa loa*). In this instance blood was taken periodically from a finger immersed in ice and the total number compared to that from the unfrozen member of the opposite hand.

More work is required to bear out conclusions based upon the appearance of microfilariæ in the urine. In pure chyluria such few observations as I have made go to show that the filarial embryos are usually dead by the time they appear in the urine,

[2] Fülleborn: Loc. cit., p. 1109.

but in hæmatochyluria, where there has been an outpouring of the blood into the chylous urine, I was able to ascertain from observations made on a case of the disease in a Japanese sailor in December, 1923, that numbers of live microfilariæ appeared in the urine passed at night time only and that they maintained a periodicity strictly parallel to that of the finger blood.

We may take it, then, that periodicity is a beautiful adaptation of nature, much more intricate and certainly not more wonderful than the many familiar adaptations in animal and plant life, of which it is possible to quote many examples. Its elucidation will come when all factors of natural history of the parasitic filaria worms are adequately studied and understood, and we may therefore conclude that there is nothing unbiological in the idea that the female filariæ have certain cyclical and well-defined periods for emptying the uterus of the imprisoned embryos.

I am, Sir, yours faithfully,
PHILIP MANSON-BAHR, M.D., F.R.C.P.

Weymouth-street, W., July 1st, 1929.

RIVERS POLLUTION.

To the Editor of THE LANCET.

SIR,—I am very glad to see that your paper has been giving prominence to the growing evil of river pollution, and it is much to be hoped that you will continue to impress upon your readers the importance of this matter. The apathy of all classes of the public to this national danger is very remarkable, and any newspaper which combats this apathy is doing a service to the country. Pollution not only destroys the amenities of the country and causes enormous annual loss to agriculture and other industries, but it diminishes the available water-supply and is a menace to the health of the whole population.

Medical men do not need converting to a belief in the evil effects of pollution but they may not fully realise how widespread the evil is and how rapidly it is growing. For example, the Clerk to the Trent Fishery Board lately stated publicly that in the 5000 square miles over which his Board exercised supervision, there was not a single authority that was dealing adequately with its sewage disposal. This is not an isolated case. It is merely an example of what is happening in almost every part of England. It is to the medical profession, more than to any other class, that those who are alive to the danger will look for support and indeed for leadership in the fight. Not only can medical men as individual missionaries preach a crusade against pollution, but collectively as a body, the profession can use the tremendous weight of its influence to press for amendment in our deplorably defective anti-pollution laws and their equally deplorable administration by our Government Departments.

I am, Sir, yours faithfully,
THOS. W. GOMM,
Hon. Secretary, Pure Rivers Society.

Lincoln's Inn-fields, W.C.2, July 1st, 1929.

BICARBONATE FOR BLACKWATER FEVER.

To the Editor of THE LANCET.

SIR,—I would like to support the statement made by Dr. Chesterman in the last paragraph of his paper (THE LANCET, June 29th, p. 1355) regarding the value of oral administration of bicarbonate of soda solution for blackwater fever. When in Kenya Colony I treated one case of blackwater fever in an Indian child 5 years old by that means. Another case of more practical interest is that of a European man aged 46 years, who had a fourth attack at some gold mines in an inaccessible district where there had been just previously two fatal cases. This man promptly retired to bed and consumed as much bicarbonate of soda in water as he could tolerate. Owing to the condition of the roads in the rainy season, it was 48 hours after the onset before I reached him and by that time hæmoglobin had disappeared from the urine and only slight jaundice remained.

It is well recognised that blackwater fever cases stand movement badly, and often, under tropical conditions, cases would have a better chance treated on the spot by such means than by submitting them to a lengthy and tedious journey to a hospital.

I am, Sir, yours faithfully,
C. P. DONNISON, M.B., B.S. Lond.,
Late Medical Officer, East African Medical Service.

Benfleet, Essex, June 28th, 1929.

A FICTITIOUS INTERVIEW.

To the Editor of THE LANCET.

SIR,—At the last meeting of the Urological Section of the Royal Society of Medicine on June 27th I gave, by invitation, a demonstration of motion and sound pictures of operations, and notice of the forthcoming demonstration was published in your issue of the previous week. There has since appeared in the public press a florid account of this demonstration with personal references to myself and a statement that I am supposed to have made at an interview. I am writing to assure my professional colleagues that I have had no communication with the press by word or in writing, and that no interview of any sort has taken place. I am taking steps to have this acknowledged by the journal in question.

I am, Sir, yours faithfully,
JOHN THOMSON-WALKER.

Harley-street, W., July 2nd, 1929.

*** A brief account of the demonstration appears under the reports of Medical Societies.—ED. L.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 22ND, 1929.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 166 (last week 191); scarlet fever, 1786; diphtheria, 1012; enteric fever, 33; pneumonia, 873; puerperal fever, 47; puerperal pyrexia, 59; cerebro-spinal fever, 9; acute poliomyelitis, 2; acute polio-encephalitis, 2; encephalitis lethargica, 25; continued fever, 1; dysentery, 4; ophthalmia neonatorum, 110. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the Metropolitan Asylums Board on June 25th–26th was as follows:—Small-pox, 239 under treatment, 3 under observation (last week 269 and 10 respectively); scarlet fever, 1304; diphtheria, 1581; enteric fever, 13; measles, 181; whooping-cough, 499; puerperal fever, 29 (plus 6 babies), encephalitis lethargica, 121; "other diseases," 41. At St. Margaret's Hospital there were 19 babies (plus 7 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 3 (0) from enteric fever, 45 (4) from measles, 4 (0) from scarlet fever, 34 (9) from whooping-cough, 20 (0) from diphtheria, 44 (12) from diarrhœa and enteritis under two years, and 22 (2) from influenza. The figures in parentheses are those for London itself.

Liverpool reported 11 deaths from measles, Leeds 4, Nottingham and Sunderland 3 each. Birmingham reported 5 deaths from whooping-cough, Wigan and Manchester 2 each; no other large town more than 1. Birmingham, Liverpool, and Manchester each reported 4 deaths from diarrhœa and Salford 3.

The number of stillbirths reported during the week was 288 (corresponding to a rate of 40 per 1000 total births), including 60 in London.

JENNY LIND HOSPITAL FOR CHILDREN.—On Saturday last Princess Mary opened a new out-patients' block and special departments in this Norwich hospital.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

THE NEW PARLIAMENT.

THE new Parliament was opened on Tuesday, July 2nd. Owing to the recent illness of His Majesty The King, it was not thought advisable to submit him to the strain of a State opening, and the ceremony was therefore performed by Royal Commission. The Lords Commissioners were the Lord Chancellor, the Earl of Kintore, Lord Southborough, Archbishop Lord Davidson, and Lord Denman. The King's speech, which was read in the House of Lords by the Lord Chancellor, stated that while His Majesty regretted that it was not possible to address Parliament in person, he thanked Almighty God that he could look forward with confidence to that complete restoration of health for which the prayers of his people throughout the Empire with a sympathy and affection which called forth his deepest gratitude were offered during the months of his long and serious illness. The Government was at present considering the unanimous report of the independent financial experts appointed to draw up proposals for a complete and definitive settlement of the German reparation problem in preparation for a conference of representatives of the Governments concerned. A settlement of this problem would enable the occupying Powers to proceed with the evacuation of the Rhineland. It was the earnest hope of the Government, in coöperation with the Governments of the Dominions of India and of foreign Powers, to ensure an early reduction of armaments throughout the world. Consultations were taking place regarding the signing of the Optional Clause embodied in the statute of the Permanent Court of International Justice. The question of the resumption of diplomatic relations with the Soviet Government of Russia was also being examined. It would be the foremost endeavour of the Government to deal effectively with the continuing evil of unemployment. Schemes were being prepared for the improvement of the means of transport, for the stimulation of the depressed export trades, for the economic development of the overseas Dependencies, for the improvement of the condition of agriculture, for the encouragement of the fishing industry, and for the improvement of the facilities for the marketing of farm and fishery outputs. Measures were being considered in coöperation with the Dominion Governments to provide greater opportunities for overseas migration. Proposals would be submitted to Parliament in due course dealing with the reorganisation of the coal industry, including hours and other factors and the ownership of minerals. Inquiries would be undertaken immediately in order to discover means to coöperate with the iron and steel and cotton industries to improve their position in the markets of the world. Bills would be introduced for amending and consolidating the existing factory legislation and for giving effect to the obligations entered into in Washington in 1919. Legislation would be undertaken to promote an extensive policy of slum clearance and to make further provision for housing in urban and rural areas. The Government had decided that a time had come to investigate the whole field of legislation relating to the sale and supply of intoxicating liquor and commissioners would be appointed for that purpose. A general survey was proceeding of the various National Insurance and Pension schemes. Meanwhile a Bill was being prepared to amend the Widows', Orphans', and Old Age Contributory Pensions Act, 1925, so as to modify the conditions applicable to certain pensions and to make some increase in the classes of persons entitled to them. A measure would be introduced to remedy the situation created by the Trade Disputes and Trade Unions Act, 1927. At the recent General Election an extended franchise placed in the hands of the whole of the people of adult years the grave responsibility for guarding the well-being of the nation as a constitutional democracy, and the Government proposed to institute an examination of the experiences of the election so that the working of the law relating to Parliamentary elections might be brought into conformity with the new conditions.

MANCHESTER BABIES' HOSPITAL.—The annual report shows that last year there were 381 admissions and 316 discharges, and that the mortality was 14·59 per cent. The most numerous cases, amounting to practically one-third of the discharges, were those of chronic dyspepsia; of rickets, which came next, there were 42. Prematurity accounted for the largest number of deaths (12). The number of premature children increases every year; in 1924 it was four, but in 1928 it had risen to 37. It has been decided to immunise against diphtheria all infants whose parents are willing.

Medical News.

UNIVERSITY OF BIRMINGHAM.—At a congregation held on June 29th the following degrees and diplomas were conferred:—

M.D.—W. D. Beck and C. G. Payton.

M.B., Ch.B.—*W. C. Smallwood, †E. G. Abdel-Malek, F. A. d'Abreu, Adele M. Frankland, C. W. Kidson, F. G. Lewis, A. J. Moffett, E. H. Parkinson, H. R. Kalra, Ali Said, Christopher St. Johnston, F. R. Smith, George Steane, K. S. Thom, and Doris I. Wall.

* First class honours. † Second class honours.

Diploma in Dental Surgery.—B. D. Britten.

Application is invited for the Walter Myers travelling scholarship of £300 for research in pathology during the year 1929–30. Particulars will be found in our advertisement columns.

UNIVERSITY OF DURHAM.—At a Convocation held on June 27th the following degrees and diplomas were conferred:—

M.D.

Max Coll, O. C. Dobson, John Hare, A. H. Holmes, F. W. Marshall, P. M. Rivaz, Gladys Stableforth, A. J. Watson, and Reginald Wear.

M.B., B.S.

Sydney Adler, J. C. Arthur, W. F. Cross, Kenneth Daniels, C. E. Goldberg, H. W. T. Hall, Wilfred Hall, John Maddison, H. D. Ord, A. R. D. Pattison, J. K. H. Scott, J. B. Tilley, and Nora Walkinshaw.

B.HY. AND D.P.H.

Katherine M. Cellan-Jones, O. C. Dobson, and A. J. Watson.

UNIVERSITY OF GLASGOW.—At a ceremony of graduation on June 28th the folllowing degrees were conferred:—

M.D.—*J. S. Young, Moses Cohen, and J. C. H. Mackenzie.

* With honours.

QUEEN'S UNIVERSITY, BELFAST.—At recent examinations the following candidates were successful:—

M.D.

*Robert Armstrong, *W. H. Belford, Robert Evans, H. E. Hall, †R. A. G. Hamilton, J. B. Lyle, W. J. M'Cracken, W. A. Scott, and H. A. Warnock.

* With commendation. † Gold medal.

M.Ch.

F. S. Carson.

M.B., B.Ch., B.A.O.

First Class Honours.—W. J. Hamilton, T. B. H. Haslitt.

Second Class Honours.—J. S. Baxter, Hugh Caldwell, Joseph Gray, J. V. Hurford, C. J. Lord, James Montgomery, and D. A. C. Wilson.

Pass.—D. R. Cairns, Mary V. Cox, J. C. Craig, C. T. Denny, Charles Dick, J. M'K. Dundee, Mabel G. Hall, D. B. L. Harris, Margaret L. Irvine, Wilson Johnston, Marcus Killen, J. K. M'Collum, W. C. MacFaul, G. J. M'Gouran, J. A. MacHugh, James M'Master, Eveline M'Mordie, A. H. Montgomery, D. M. Quinn, L. F. Ragbir, J. G. Ryan, Thomas Scott, J. P. Thomson, H. B. C. M. Wallace, and Alexander Woods.

UNIVERSITY OF LEEDS.—At a congregation held on July 1st the degree of Doctor of Science, honoris causa, was conferred on Dr. Thomas Wardrop Griffith, Emeritus Professor of Medicine in the University.

Introducing Dr. Griffith, Prof. Veale spoke of his unbroken and close connexion with the Medical School for 46 years. Appointed professor of anatomy in 1883 at the early age of 26, he had at once brought the School of Anatomy to the front rank, and had identified himself with the interests and development of the Medical School in every direction. The present fine premises were largely due to his efforts, and the University owed him a lasting debt of gratitude for the careful planning and sound construction of this building, which, though now being substantially enlarged, would be a lasting memorial of his efforts. In 1910 Dr. Griffith had become professor of medicine, and as a clinical teacher he had shown the same mastery of style as had distinguished him in anatomical science. As a physician he had added much to the prestige of the school and to medical science. As an authority on cardiology, and more particularly the difficult and recondite problems of cardiac arrhythmia, his fame was surely established by accurate and extensive clinical research. Throughout his career he had been distinguished by a personal integrity of the highest order, and unswerving loyalty to the most honourable traditions and ideals of his profession, and a devotion excelled by none to the school which his scientific attainments had done so much to adorn.

The degree of Doctor of Medicine was conferred on G. R. Baxter.

BRITISH HOMŒOPATHIC CONGRESS.—Prince George and the Lord Mayor of London will welcome the delegates to this congress which is opening at the Connaught Rooms, London, to-day, Friday, July 5th, under the presidency of Dr. Thomas Macklin Dishington. It is stated that some 250 American medical men are attending the congress.

ST. BARTHOLOMEW'S HOSPITAL AND COLLEGE.—The Old Students' annual dinner will be held in the Great Hall of the hospital on Tuesday, Oct. 1st, with Sir Frederick Andrewes in the chair.

DREADNOUGHT HOSPITAL, GREENWICH.—The Duke and Duchess of York will open the Devonport Pathological Laboratory and the Devonport Nurses' Home at this hospital at 3 P.M. on Monday, July 15th.

DR. JESSIE MACGREGOR PRIZE IN MEDICAL SCIENCE.—The trustees announce the award of this prize, for the triennial period 1929–31, to Miss Helen M. Russell, F.R.C.P. Edin., for her record of work on malaria in the Vasiliki Valley, Macedonia, during 1925. The prize was founded in 1908 as a memorial to the late Dr. Jessie Maclaren Macgregor, of Edinburgh, and is of the value of £75.

A NEW EDENBRIDGE HOSPITAL.—Since its opening, eight years ago, the Edenbridge and District War Memorial Hospital has been carried on in a converted house which has become unsuitable owing to its structure and its situation on a noisy motor road. It has therefore been decided to erect, at a cost of £20,000, a new building of 20 beds on a three-acre site presented by Mr. T. A. Mason.

LIVERPOOL AMBULANCE SERVICE.—Hitherto the voluntary hospitals of Liverpool have possessed no ambulances of their own and have been dependent upon those belonging to the police, which are intended only for the conveyance of street casualties. Now, however, an ambulance has been purchased for £1500 by the Liverpool University Guild of Undergraduates out of the proceeds of the recent "Panto. Day," and is about to be presented to the Merseyside Hospitals Council.

INTERNATIONAL CONGRESS OF DERMATOLOGY AND SYPHILOLOGY.—The eighth meeting of this congress will be held at Copenhagen from August 5th to 9th of next year. The three principal subjects of discussion will be the Ætiology and Pathogenesis of Eczema; Immunity, Reinfection, and Superinfection in Syphilis; and Tuberculosis of the Skin and Its Treatment. Further particulars may be had from the Secretary-General, Dr. Svend Lomholt, Raadhuspladsen 45, Copenhagen.

INTERNATIONAL POST-GRADUATE COURSES IN BERLIN.—Regular courses of post-graduate study are held in Berlin at short intervals, and in addition a number of special courses in various subjects have been arranged for October of this year and for March, 1930. Particulars of these may be had from the Kaiserin Friedrich-Haus, Luisenplatz 2, Berlin, N.W.6, which also provides information about "guest-assistantships" in the clinics, hospitals, and laboratories of the city.

ROYAL SOCIETY OF MEDICINE.—At the annual meeting of Fellows of the Royal Society of Medicine on July 2nd, with Lord Dawson, the President, in the chair, it was stated that the National Fund for the Acquisition of Radium was to be administered under a Royal Charter, which would probably be operative in the autumn. It was also announced that members of the Society resident in Sydney, New South Wales, with other medical men in that city, had made the first application to the Society to be allowed to form a section or branch. After the meeting a demonstration was given of a photostat with which the library has been equipped on the suggestion of Mr. Edwards, the secretary. This will make it possible to send to applicants in the provinces or abroad exact reproductions of pages or articles of any books or periodicals, thus fulfilling the circulating requirements without either depleting the library or interfering with its primary function of reference library. The whole process of reproduction occupies less than an hour.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.—The eighty-eighth annual meeting of this Association will open on Wednesday, July 10th, at the Westminster City Hall, Charing Cross-road, London, W.C., and will continue on Thursday and Friday at the house of the British Medical Association in Tavistock-square. Prof. J. Shaw Bolton will take the chair at the first meeting, and in the afternoon, after a civic welcome by the Mayor of Westminster, the new President, Dr. Nathan Raw, will be inducted to the chair and will deliver an address entitled Fear: A Sociological Study. The Gaskell Medal and Prize for 1929 is to be presented on Thursday to Dr. Alexander Walk. The annual dinner will be held at the Hotel Metropole, Northumberland-avenue, at 7.15 for 7.30 P.M. on the same day. The proceedings on the two subsequent days will include a visit to Springfield Mental Hospital on Thursday afternoon and a discussion on the report of the Mental Deficiency Committee on Friday morning.

Mr. Arthur Greenwood, the Minister of Health, has appointed Mr. Joseph Compton, M.P., to be his Parliamentary Private Secretary.

SOUTH DEVON AND EAST CORNWALL HOSPITAL.—The first section of the extension scheme of this institution, consisting of a new children's ward, has been opened by the Countess of Mount Edgcumbe.

ULSTER HOSPITAL FOR WOMEN AND CHILDREN.—Last year the number of admissions to the wards, of out-patients, and out-patients' visits constituted a record, the total exceeding by more than 5000 the figures of the preceding year. The average cost per effective bed was £75 6*s.* 6½*d.*, and the daily cost of in-patients 4*s.* 1½*d.*

HOSPITAL OF ST. JOHN OF JERUSALEM.—The following appointments to the Order have been made:—As officers: Dr. K. F. Lund, Dr. R. C. Robertson, Dr. F. N. Kay Menzies, Major S. J. C. Holden, Dr. B. R. Billings, Dr. A. E. Porter, Major W. H. F. Noble, Dr. A. B. McMaster, Dr. A. L. Macleod, Major F. R. Humphreys, Colonel A. H. Tubby, Lieut.-Colonel C. T. Samman, and Dr. E. Burnet. As serving Brothers: Dr. G. Skeen, Captain H. F. J. Norrie, Dr. J. C. Bekitt, Major W. H. Borrie, Dr. J. Graham, Dr. A. Tennyson-Smith, Dr. K. Mackenzie, and Lieut.-Colonel G. E. Peacock.

UNIVERSITY OF LIVERPOOL ANIMALS' HOSPITAL.—On June 28th Lord Howard de Walden opened a new hospital at the Liverpool University Veterinary School. It is the first animals' hospital to be conducted in this country by a university, and is primarily intended for research and the instruction of veterinary students. The building funds have come from subscribers, one of the chief contributors being Lord Howard de Walden, and from the Development Commissioners, through the Ministry of Agriculture, who have offered £15,000 on a pound-for-pound basis. In addition an annual grant of £2850 will be received.

ROYAL MEDICAL BENEVOLENT FUND.—At a recent meeting of the Committee 39 grants were made amounting to £612. The following are notes on six of the cases helped by grants and annuities:—

Widow, aged 72, of M.R.C.S., whose husband received an annuity from this Fund during the last years of his life. On his death his widow had only the old age pension of £26. Voted £36. Her total income is therefore only £62 a year. Further assistance is being sought for this lady.

Widow, aged 80, of M.R.C.S. and L.S.A. The widow is totally blind. She has an income of £77 a year. The Fund voted £36, making a total income of £113, on which the widow and two daughters have to live. One daughter has to give her full time to looking after her mother owing to her infirmities, the other is trying to find work, but, as she is 47 years of age, has been unable to get employment as a clerk.

Widow, aged 75, of M.R.C.S. and L.S.A., has an income of £72 a year. Voted £26.

Daughter, aged 76, of M.R.C.S., with a private income of £20 and old age pension of £26. Voted an annuity of £30, making a total of £76.

Daughter, aged 84, of M.D. No private income, only the old age pension of £26. Voted an annuity of £30, making a total income of £56. This lady lives with her niece, a music teacher, who has to keep and maintain her on the above.

Daughter, aged 73, of M.R.C.S. Has only the old age pension of £26. Granted an annuity of £40, making her total income £66.

Subscriptions and donations should be sent to the hon. treasurer of the Fund at 11, Chandos-street, Cavendish-square, London, W. 1.

BRITISH PHARMACEUTICAL CONGRESS.—The British Pharmaceutical Society held its annual congress last week in Dublin, with the coöperation of the Irish Pharmaceutical Society and the Pharmaceutical Society of Northern Ireland. Our Dublin correspondent writes: "The weather was at its best and all who attended the congress had a pleasant week. The congress opened with a stimulating address from the President, Mr. R. R. Bennett, whose subject was the Changing Foundations of Materia Medica. He spoke of the transition from crude drugs to standardised products, and of the gradual replacement of certain natural products by identical substances synthetically produced. Among many other papers one of more than special interest was read by Mr. M. V. Sargent, of Naas, on the Native Materia Medica of Ireland. He drew attention to the luxuriant wild growth in parts of Ireland of medicinal plants such as digitalis, male fern, broom, dandelion, and couch grass, and he suggested that the collection of these plants could be made to pay from the commercial point of view. The social side of the congress was also successful. The banquet, held in the Mansion House, was honoured by the presence of His Excellency the Governor-General of the Irish Free State. A pleasant garden party was given in the beautiful grounds of the Royal Zoological Society of Ireland by the Directors of Messrs. Boileau and Boyd, Ltd., manufacturing chemists."

ASSOCIATION OF SURGEONS' SCHOLARSHIP.—The Association of Surgeons of Great Britain and Ireland invites applications for a surgical scholarship of £350 to be held for one year while the holder pursues some definite line of research or study. Further particulars will be found in our advertisement columns.

ROYAL DUNDEE INSTITUTION FOR THE BLIND.—At the annual meeting of this Institution it was stated that the number of blind employees was now 108, compared with 87 in 1920. The blind workers could not produce enough to enable the directors to make a profit, and therefore the increase in workers meant an increase in the anual deficit. Although the increase in goods sold was £1100, there was a net loss on the industrial account of £735 as compared with £496 last year. The general charity account showed a deficit of £2144 compared with last year's £2245.

HOSPITALS AND MOTORISTS.—Under this title the *Manchester Guardian* on June 29th published a selection of the results of a questionaire sent to voluntary hospital authorities for the purpose of discovering whether the problem of payment for treatment in motor accidents is as acute as some recent hospital reports have suggested. "The answers show," it is stated, "that many institutions are suffering a heavy financial strain; that very few of the patients contribute anything to the cost of their treatment; and that most hospital authorities agree on the necessity for some plan whereby payment should be assured." At the Manchester Royal Infirmary 140 in-patients were received, who spent 2708 days in hospital at a cost to the infirmary of £1196, and the patients' contributions amounted to £152. At Ancoats Hospital the cost to the hospital was £320 and £12 was received as patients' contributions. At the Manchester Victoria Jewish Hospital the cost was estimated at £450 and the cash received in return at only £50. At Oldham Infirmary during 1928 187 patients were treated at a cost of approximately £800 and "the sum received in respect of these patients was negligible." At the Royal Infirmary, Bradford (Yorks), 137 in-patients (who remained 2929 days in hospital) and 229 out-patients were treated at a total cost of £1174 and about £24 was received as contributions from the in-patients. At the Royal Infirmary, Derby, 100 victims of motor accidents were admitted during the year ended May 31st last, the average number of beds occupied during this period being 14. In addition there were a large number of out-patients treated. The cost of treating the in-patients was £1799 and the total contributions received towards their maintenance was £84 8s. At Warrington Infirmary £735 was expended in in-patient treatment alone last year and towards this the patients contributed £89. At Leeds General Infirmary 1135 motor accident cases were received. They cost the institution £4307 and towards that sum contributed £167. Much the same replies were received from hospitals at Blackpool, Sunderland, Bury, and other towns to the questionaire of the *Manchester Guardian*.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES, 11, Chandos-street, Cavendish-square, W.
FRIDAY, July 12th.—8.30 P.M., Continuation of Discussion on Colonel L. W. Harrison's Paper, Review of Experimental Work in Syphilis and its Possible Bearing on Man.

SOCIETY FOR THE STUDY OF INEBRIETY, 19, Park-crescent, Portland-place, W.
TUESDAY, July 9th.—4 P.M., Mr. W. McAdam Eccles: Some Gaps in the Study of Inebriety (Presidential Address), followed by a discussion on the Toxic Effects of Methylated Spirits and Impure Forms of Alcohol, to be opened by Sir William Willcox.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION.
WEDNESDAY, July 10th.—(At the Westminster City Hall, Charing Cross-road, W.C.), Annual Meeting.
THURSDAY and FRIDAY.—(At the B.M.A. House, Tavistock-square), Annual Meeting continued.

ROYAL SANITARY INSTITUTE.
SATURDAY, July 13th.—Annual Congress opens at Sheffield.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, London, W.
MONDAY, July 8th, to SATURDAY, July 13th.—ROYAL NATIONAL ORTHOPÆDIC HOSPITAL, 234, Gt. Portland-street, W. Mond. 1.30 to 2.30 P.M., Demonstration by Mr. Laming Evans. 2.30 to 4 P.M., in In-patients and Out-patients Depts. No fee.—LONDON LOCK HOSPITAL, 91, Dean-street, Oxford-street, W. Tues., 3 P.M., Clinical Demonstration by Major Corbett. No fee.—HOSPITAL FOR DISEASES OF THE SKIN, Blackfriars-road, S.E. Afternoon course consisting of instruction in Out-patient Dept. Special case demonstrations on Tues. Further particulars from the Fellowship of Medicine.

NORTH-EAST LONDON POST-GRADUATE COLLEGE Prince of Wales's General Hospital, Tottenham, N.
MONDAY, July 8th.—2.30 to 5 P.M., Medical, Surgical and Gynæcological Clinics. Operations.
TUESDAY.—2.30 to 5 P.M., Medical, Surgical, Ear, Nose and Throat Clinics. Operations.
WEDNESDAY.—2.30 to 5 P.M., Medical, Skin, and Eye Clinics. Operations.
THURSDAY.—11.30 A.M., Dental Clinics. 2.30 to 5 P.M., Medical, Surgical, Nose, Throat and Ear Clinics. Operations.
FRIDAY.—10.30 A.M., Throat, Nose and Ear Clinics. 2.30 to 5 P.M., Surgical, Medical, and Children's Diseases Clinics. Operations.

EAST LONDON HOSPITAL FOR CHILDREN, Shadwell, E.
WEDNESDAY, July 10th.—4 P.M., Mr. K. J. Acton-Davis: The Surgical Treatment of Rickets, with Illustrative Cases.

ST. PAUL'S HOSPITAL, Endell-street, W.C.
THURSDAY, July 11th.—4.30 P.M., Mr. Claude Mills: Some Interesting Urological Cases with Demonstrations of Pathological Specimens and Radiograms of Same.

Appointments.

GRIFFITHS, J. I., M.B., B.S. Lond., has been appointed Third Asst. M.O. to the Hammersmith Board of Guardians.
MACGLASSON, J., M.B., Ch.B. Edin., Parochial Medical Officer and Vaccinator, Canonbie.
THOMSON, C. S., M.D., Ch.B. Glasg. D.P.H., Part-time Lecturer in Public Health Administration in the University of Belfast.
Certifying Surgeons under the Factory and Workshop Acts: GOODWIN, A. C., M.B., B.Ch. Oxf. (Newport, Isle of Wight); NELSON, H. P., M.B., B.S. Durh. (Brampton, Cumberland); O'SHEA, J. J. M.B., B.Ch. R.U.I. (Chipping Norton); and PRESTON, F., L.R.C.P. Lond., M.R.C.S. (Norwich).

Vacancies.

For further information refer to the advertisement columns.

Association of Surgeons of Great Britain and Ireland.—Surgical Scholarship. £350.
Birmingham and Midland Homœopathic Hospital and Dispensary, Easy-row.—H.S. £150.
Birmingham, Selly Oak Hospital.—Cas. O. At rate of £200.
Birmingham City Mental Deficiency Institution, Coleshill Hall.—Med. Supt. £700.
Birmingham University.—Walter Myers Travelling Studentship £300.
Bombay Goculdas Tejpal Hospital.—Hon. Surgeon.
Brighton, Royal Sussex County Hospital.—H.S. £150.
Bristol Royal Infirmary.—Sen. Res. M.O. £200. Also Res. HS.'s. to Special Departments. At rate of £60. Res. Cas. H.S. and Dental H.S. At rate of £80 each.
Burton-on-Trent General Infirmary.—H.S. £150.
Buxton, Devonshire Hospital.—Asst. H.P. At rate of £150.
Cardiff, Welsh National School of Medicine.—Jun. Asst. in Med. Unit. £500. Jun. Asst. in Surg. Unit. £350. Also Asst. Lecturer in Pathology. £500.
Cardiff Royal Infirmary.—Four H.S.'s and three H.P.'S. Each at rate of £50.
Chester Royal Infirmary.—H.S. and Cas. O. £120.
City of London Hospital for Diseases of the Heart and Lungs, Victoria Park, E.—Asst. Laryngologist.
Colne Borough.—M.O.H., &c. £800.
Dreadnought Hospital, Greenwich.—Asst. Radiologist. 50 gns.
Durham County Hospital.—Jun. H.S. At rate of £120.
Exeter, Royal Devon and Exeter Hospital.—Asst. H.S. At rate of £100.
Erminster, Devon Mental Hospital.—Jun. Asst. M.O. £300.
Glasgow, Hawkhead Asylum.—Asst. M.O. £275.
Gloucestershire Royal Infirmary, &c.—Second H.S. At rate of £100.
Great Yarmouth General Hospital.—Jun. H.S. £100.
Hospital for Consumption, &c., Brompton, S.W.—H.P. At rate of £50.
Hull Maternity Home and Infants' Hospital, Hedon-road.—Res. M.O. £450.
Ilford Emergency Hospital.—Sen. and Jun. H.S.'s. £110 and £100 respectively.
Ipswich, East Suffolk and Ipswich Hospital.—H.S. At rate of £120.
Jewish Maternity Hospital, Underwood-street, E.—Res. M.O. At rate of £50.
Liverpool Open-Air Hospital for Children, Leasowe.—Jun. Res. M.O. At rate of £200.
Lowestoft and North Suffolk Hospital.—H.S. £120.
Macclesfield General Infirmary.—Res. H.S. £180.
Maidstone, West Kent General Hospital.—Hon. Anæsthetist.
Manchester, Ancoats Hospital.—Res. M.O. £150.

Manchester, St. Mary's Hospitals.—Four H.S's. Each at rate of £50.
Marseilles, Queen Alexandra Memorial Hospital.—Res. M.O. At rate of £150.
Middlesex County Council.—Tuberculosis M.O. £750.
National Hospital, Queen-square, W.C.—Pathologist. £200.
Newcastle-upon-Tyne, City Hospital for Infectious Diseases.—Res. Med. Asst. £350.
Nigeria, West African Medical Staff.—Pathologists. Each £800.
Nottingham General Hospital.—Two H.S.'s for Special Depts. Each at rate of £150.
Oswestry, Shropshire Orthopædic Hospital.—H.S. £200.
Plaistow Fever Hospital, E.—Second Asst. M.O. £300.
Preston and County of Lancaster, Queen Victoria Royal Infirmary.—H.P. £150.
Prince of Wales's General Hospital, Tottenham, N.—Hon. Asst. P.
Princess Louise Kensington Hospital for Children, North Kensington.—Hon. Radiologist.
Rhondda U.D.C.—Asst. M.O.H., &c. £600.
Romford Isolation Hospital, Rush Green.—Med. Supt. £750.
Rotherham Hospital.—Sen. H.S. £200.
Royal Army Medical Corps.—25 Commissions.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Cas. O. £150.
St. Albans, Napsbury Mental Hospital.—Jun. Asst. M.O. £485.
St. John's Hospital, Lewisham, S.E.—Two Res. House Appts. Each at rate of £100.
St. Leonards-on-Sea Buchanan Hospital.—Locum tenens H.S. At rate of £250.
St. Mary's Hospital for Women and Children, Plaistow, E.—Clinical Asst.
Sheffield Children's Hospital.—Jun. H.S. £100.
Sheffield Royal Hospital.—Res. Ophth. H.S. At rate of £80.
Sheffield Royal Infirmary.—Surg. Reg. £200. Also Asst. Cas. O. H.S., Ophth. H.S., and Asst. Ophth. H.S. Each at rate of £80.
Steaford, Kesteven Mental Hospital.—Med. Supt. £700.
South Africa, Bloemfontein Hospital.—Sister for X Ray and Electrical Dept. £300.
Stafford, Staffordshire General Infirmary.—H.S. At rate of £200.
Stoke-on-Trent, North Staffordshire Royal Infirmary.—H.S. £150. Also H.S. to Ophthalmic and Aural Depts. At rate of £150.
Swansea Hospital.—H.S. £150.
Tunbridge Wells and Counties General Hospital.—H.S. £160.
West End Hospital for Nervous Diseases, Gloucester Gate, Regent's Park, N.W.—Jun. H.P. At rate of £100.
West London Hospital, Hammersmith, W.—Aural and Ophth. H.S. and Res. Asst. Cas. O. At rate of £100. Also Res. Anæs. At rate of £100.
Willesden General Hospital, N.W.—Refraction Assistant. 50 gns.
Winchester, Royal Hampshire County Hospital.—Res. H.S. £150.
Woolwich and District War Memorial Hospital, Shooters-hill, S.E. H.P. and H.S. Each at rate of £125.
The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Callington (Cornwall) and at Felixstowe (Suffolk).

Births, Marriages, and Deaths.

BIRTHS.

BUTLER.—On June 25th, to Florence (*née* Jordan), the wife of Dr. M. F. Butler, of Beckenham-road, Beckenham, of a daughter.
HILLMAN.—On June 28th, at Bentinck-street, W., the wife of Oscar Stanley Hillman, M.S., F.R.C.S., Wilson-grove, Southsea, of a daughter.
SHAW.—On June 22nd, at a nursing home in London, the wife of Dr. F. R. S. Shaw, M.B., M.C., Tuz Khurmatu, Iraq, of a son.
THOMSON.—On June 28th, at Lavington, Barnet, Herts, the wife of Dr. N. Gray Thomson, of a daughter.

MARRIAGES.

FRANCE—CORKERY.—On June 26th, at St. Augustine's, London, Robert Scoular France, M.B., Ch.B., to Marjorie Griffin Courtenay, daughter of the late Colonel W. A. Corkery, Indian Medical Service, and of Mrs. Corkery, Ael-y-Bryn, Merthyr Vale, Glamorgan.

DEATHS.

HENDERSON.—On June 23rd, at Alister Cottage, Inverness, Lieut.-Colonel George Henderson, M.D., F.L.S., F.R.G.S., late I.M.S. (H.E.I.C.S.), in his 93rd year.
LEAPINGWELL.—On June 28th, Edward Jodrell Leapingwell, M.B., of Apsley Guise, aged 80 years.
MOXHAM.—On June 27th, at Aldborough, Marcus Camplin Moxham, M.R.C.S., L.R.C.P., L.S.A.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

THE LANCET: SUBSCRIPTION RATES.

INLAND	One Year	£2	2	0
	Six Months	1	1	0
	Three Months	0	10	6
ABROAD	One Year	2	10	0
	Six Months	1	5	0
	Three Months	0	12	6

Notes, Comments, and Abstracts.

DISEASES OF THE JEWS.

IN opening a symposium on Some Diseases of the Jewish Race at the London Jewish Hospital Medical Society on June 13th, with Dr. A. GOODMAN LEVY in the chair, Sir HUMPHRY ROLLESTON said that diseases had been described as racial diseases of the Jews for no better reason than that the first recorded cases happened to have occurred among Jews. Such was the case with the condition known as dystonia musculorum deformans, or Oppenheim's disease. But there were diseases which if they did not appear exclusively among Jews were said to occur more frequently among them—e.g., thrombo-angiitis obliterans. It had recently been suggested that this disease was on the decrease among Jews and on the increase among Gentiles, and it was possible that the stress laid in the past on the racial nature of this affection had led to its being overlooked when it occurred among Gentiles. According to Telford and Stopford the alleged racial character of this disease was the result of a "topographical" accident. It was said by some that its course in Jews was earlier and more severe than in Gentiles, but the opposite view had also been advanced. On the question of amaurotic familial idiocy it must be pointed out that there was a series of allied conditions of which amaurotic familial idiocy and retinitis pigmentosa were the extremes, the first occurring early in life among Jews and the latter coming on much later in the case of both Jews and non-Jews. Both obesity and diabetes were relatively common in Jews, and it had been suggested by Joslin that Jews got diabetes because they were fat, and they were fat because of dietetic excess. But it must be remembered that Gaucher's and Niemann's diseases, which were disturbances of fat metabolism, were probably more frequent among Jews. Acromegaly had also been said to be more common among Jews, and anterior lobe pituitarism as a feature of the Jewish race was compatible with Keith's contention that the special effects of pituitary activity were best seen in the Caucasian type. That Gaucher's disease was regarded as being specially common among Jews was probably due to the accident that it had been extensively investigated at the Mount Sinai Hospital. Niemann's disease, which was probably a more severe type of Gaucher's disease, seemed to be more frequent among Jews—if one could argue from the 15 cases reported. It probably exemplified the rule suggested by the relationship of amaurotic familial idiocy and retinitis pigmentosa—namely, that in the Jewish race there was a constitutional factor which determined an earlier onset and a more severe form of certain diseases. On the incidence of cancer, the recent work of Sourasky had shown that whilst the total cancer mortality among Jews corresponded fairly with that of the countries in which they resided, there were some differences in the distribution of these growths, but that these differences were probably due to the mode of life led by Jews rather than to a racial factor. There appeared to be a definite resistance to tuberculous infection among Jews, which was perhaps to be explained partly by the infrequency of alcoholism among them.

Mr. A. H. LEVY pointed out that it was wrong to regard amaurotic familial idiocy as a specifically Jewish disease. Juvenile and adolescent cerebro-macular degeneration were generally looked on as being allied to amaurotic familial idiocy, but in his opinion were not at all allied. Mr. Levy touched on the question of the alleged greater frequency of glaucoma among Jews, which he could not substantiate from his experience, and on the incidence of cataract, which was probably not disappearing so rapidly among Jews as it seemed to be doing in the general population.

Cancer and Tubercle.

Mr. M. SOURASKY said that the fact which emerged from a recent investigation was that Jews as a race were neither immune from cancer nor specially prone to it. The statistics of six European capitals with large Jewish populations had been scrutinised, and in each of them the incidence of cancer among Jews followed closely that obtaining among their neighbours. On the whole there was a closer relationship between the Jews and non-Jews of any particular city than between the Jews of different cities. But apparently Jews had a definitely different incidence of cancer of the various organs from that of their neighbours.

Among Jews cancer of the generative organs and of the mouth seemed to be less common and that of the gastro-intestinal tract more so than among non-Jews. There were, however, established ætiological factors operating in the Jewish community capable of explaining these differences without assuming the operation of a problematic racial factor—immunity or predisposition, as the case might be. Thus the well-known association of cancer of the tongue with

chronic inflammation of this organ, which was so often of syphilitic origin, adequately explained the low incidence of cancer of the tongue in Jews, as syphilis was decidedly less common—and was still less common in the past—among them than among non-Jews. Not a single case of penile cancer had been recorded for Jews, whilst the disease accounted for about 1 to 2 per cent. of all cancer deaths among non-Jewish men. As for cancer of the breast, the incidence in Jewish women varied in different cities, being sometimes lower, sometimes a little higher than that for the rest of the population. In London the incidence among the poor Jews was lower than that among the wealthy. It was pointed out that among the richer Jews there were more unmarried women, the marriages were later, and the birth-rate was lower, all factors held to favour breast cancer. The remarkably low incidence of uterine cancer (one-third to one-half the number occurring in the rest of the population) might be attributable to the observance of the Mosaic system of hygiene, and it was of interest to note that this form of cancer appeared to be increasing in the Jewish community.

Dr. J. BURNFORD remarked upon the extreme rarity of any specifically racial diseases, whether of Jews or of other races. The topography of disease was not so much a question of racial predisposition and immunity as one of environment. Theoretically speaking there was a better case for racial immunity than for predisposition. Natural selection was more likely to produce a group of people resistant to certain affections than one which was specially prone to particular diseases, and racial diseases had a way of evaporating into thin air when they were carefully investigated. It was generally assumed that diabetes was very common amongst Jews; in the speaker's experience this had not been very noticeable.

Dr. W. M. FELDMAN said that the mortality-rate from tuberculosis was lower among Jews than among Gentiles, which was to be explained by the fact that the disease was less fatal among them. This could be seen from the greater number of Jews who responded favourably to treatment. In Dr. Feldman's opinion the explanation was probably that Jews acquired immunity from frequent exposure during childhood to mild doses of tuberculosis, being especially prone to this on account of the greater frequency of the disease among Jews, its milder character, and the greater degree of overcrowding. The greater care Jews bestowed on their infants and their greater sobriety probably also counted. The absence of drunkenness among Jews might be due to the fact that Jews usually took some food with their drink (thus unintentionally delaying the absorption of alcohol into the blood) and by the deterrent effect of public opinion, which in Jewish communities ostracised the drunken.

Eyesight.

Mr. A. SOURASKY said that in a recent investigation 1649 Jewish boys were examined as regards eyesight in a group of Jewish evening schools in the East End of London, and 600 non-Jewish boys in London County Council schools in the same district. The tests showed that the percentage of Jewish boys with visual defect was 43·2 as against only 21·7 of the non-Jewish. The conclusion often drawn from this, that the extra hours of evening study in Jewish classes were responsible for this grievous condition, was unjustified. children at the age of 5 and 6 who had not yet reached school age, and therefore could not be influenced by school-life, showed a similar amount of visual defect to that found at the school-leaving age, between 12 and 14. It was found on an investigation of defects seen among 516 Jewish and 892 non-Jewish children that the proportion of long-sighted and short-sighted was such as to suggest that among Jewish children short sight was twice as frequent as among non-Jewish. At the same time the tests led to the detection of very striking differences in the kind of long-sight observed among Jewish children. One type, "low hypermetropia," was found to be more common in Jewish children than the other forms of long sight, and this was not the case with non-Jewish children. The predisposition to short sight in Jewish children and the greater incidence among Jews would appear to be the concomitant of the fact that the anthropological characteristics of the eyes of Jews were such as to leave little margin between the normal and the myopic. Hence slight disturbances were more likely to result in myopia in Jewish children than in the non-Jewish.

Dr. J. BRANDER remarked on the earlier onset of dementia præcox among Jews.

In the subsequent discussion Dr. F. PARKES WEBER said that in his opinion thrombo-angiitis obliterans was a disease with an economic basis rather than a racial one. Dr. BERNARD MYERS held that many Jewish characteristics could be explained on the basis of endocrine disturbances.

Dr. D. NABARRO and Dr. N. PINES spoke on arteriosclerosis and Dr. H. GAINSBOROUGH on the infrequency of syphilis in the older Jews.

A vote of thanks to Sir Humphry Rolleston was moved by Dr. L. MANDEL.

BOOKS ON CHILD CARE.

THE issue in all countries of numerous books on the care of infants and children is an interesting sign that mothers, and not only educated mothers, are abandoning tradition alone as a guide to nurture and are seeking help from science. A manifestation of this spirit in this country is the popularity of Baby Week, now being held in London for the thirteenth successive year. Reports of conferences and lectures stimulate women concerned with the rearing of children to seek further information and advice on choice of popular books is often sought from the family doctor. Among those produced recently three written by medical men deserve attention. "The Care of the Child," by Dr. Alton Goldbloom (New York: Longmans, Green and Co. Pp. 240. $1.50) is designed especially to act as a guide to perplexed mothers, and to provide them with up-to-date knowledge on the feeding and management of small children. In selecting the points to be discussed the author has been guided by the questions which have most frequently been put to him in the past. The normal limits of growth, development, and activity are well defined, and all that advice which deals with nursing and general management is admirable. The section on artificial feeding is rather more open to criticism. The statement appears that "the group of dried milks, and unsweetened condensed milks, are quite as satisfactory as ordinary milk"; those who do not believe this to be true would prefer that the perplexed mother should not see it set out so dogmatically. The chapter on diets of older children is a particularly useful one, a clear idea being given not only of the articles of food which are suitable, but of the quantities. "The Essentials of Infant Feeding" is the title of an excellent little book by Dr. E. A. Barton, of which a second edition has now appeared. (London: H. K. Lewis. Pp. 79. 3*s.* 6*d.*) This book provides an admirably clear introduction to the subject of infant feeding which would not be beyond the grasp of the educated mother, though it is adequate for the medical student. The teaching is well up to date. In the second edition complementary replaces supplementary feeding as the method of choice in mixed feeding, and recent views on vitamins have been included. "The Child's Diet" (H. K. Lewis. 3*s.*) is also a book which may safely be put in the hands of parents. This little book was originally designed by Dr. J. Sadler Curgenven for the use of his own patients and has now reached its third edition. It deals with the feeding of normal infants and children, and with diet in a few common nutritional disorders. It is written simply, and conveys throughout the impression of the writer's extensive practical experience. For the artificial feeding of infants comparatively simple dilutions are recommended; the actual details of preparation of the mixtures are not very clearly explained. The chapter on the feeding of older children is perhaps the best part of the book, and the closing chapter containing nursery recipes should also be of great assistance to mothers.

Rather more elementary in treatment are two little books, by Mrs. J. Langton Hewer, which have achieved great popularity. One, which is hardly more than a pamphlet, "The Baby of To-day" (Bristol: John Wright and Sons. Pp. 32. 4*d.*) is intended for those beginning to study creche work, girl guides, and the like, and provides sound teaching in concise form on the essentials of baby management, mental and physical. Rather surprisingly, long clothes are still recommended for the young baby, and the sample tables of food suggest that a child of 18 months should have none but minced meat, though the value of hard, crusty food is emphasised. The longer book, of 186 pages, entitled "Our Baby," and issued at 2*s.* 6*d.* by the same publishers, first appeared in 1891, and this year reached its nineteenth edition. It is addressed to mothers and nurses, and has for some ten years past served as the standard text-book for students taking the advanced examinations of the National Association for the Prevention of Infant Mortality. "Our Baby" is essentially a text-book, its 186 pages covering the ground connected with pregnancy, and such varied aspects of infant hygiene and care as feeding (natural and artificial), clothing, exercise and sleep, nursery life, and mental and moral training. Further chapters give an outline of minor troubles and ailments, accidents, and illnesses to which the young child is prone, with a section on nursery remedies and a final chapter on "Baby in the Tropics." The paramount importance of fresh air in the nursery is emphasised throughout the book, and also the fact that draughts may often be abolished by opening the window wider as easily as by shutting it. Dietitians will not all endorse the teaching that pasteurisation of milk does not kill disease germs and is not to be recommended. The book contains an immense amount of sane instruction and, with its 36 illustrations and numerous headings, presents an attractive appearance. Finally we may mention "A Handbook for Mothers," by C. Phyllis Armitage. (London: John Bale, Sons and Danielsson. Pp. 124. 2*s.*). The first three sections of this

little book, devoted respectively to "Pregnancy," "The Infant" and "The Child," are characterised by optimism born of common sense. The author is at pains to impress upon the mother the strong probability that she and her baby are normal, average people, and that good health and moderate progress, though less interesting to the neighbours than sensational excursions, are matters for pride and not for regret. At the same time, individuality must be allowed for, and a mother must be prepared, on occasion, to supersede an ideal theory by an intelligent sense of proportion, and not to suffer undue heart-burnings if the baby next door sleeps longer or gains weight more rapidly than her own. The book is designed especially for use by mothers who may be far from medical help, and Parts IV. and V., dealing with "Ailments of Infancy and Childhood" and "Infectious Diseases" include directions as to the use of certain drugs and forms of treatment unusual in a volume of this nature. A few of these instructions tend to be somewhat dogmatic. But, on the whole, the advice offered is thoroughly sound. A short appendix describes the use of some simple antiseptics and gives directions for first-aid and for the application of fomentations and enemata, together with a few useful recipes. The handbook is to be commended, as Dr. Quin Lennane, medical officer of health of Battersea, says in his foreword, for its "conciseness, simplicity of language, and avoidance of technical nomenclature."

A TUBERCLE-FREE HERD.

ADDRESSING a party of visitors to the Edinburgh Corporation dairy farm at Colinton Mains, Mr. A. Gofton, Chief Veterinary Officer for Edinburgh, lately gave a valuable account of the steps which have been taken there to secure that the cattle shall be free from tuberculosis.

He explained that the herd which had been formed under his regulation at Colinton Mains existed for one purpose only—namely, to supply milk of the best quality to the children in the City Infectious Disease Hospital. Up to a certain point the Corporation had run the herd on the usual stall-fed principle, and it took a great deal of persuasion before it was ultimately decided to embark on the policy of tubercle-free herd, with all the equipment necessary for producing milk of the best quality. When the decision to change over was reached two questions had to be considered. The first was the provision of the basal stock of tubercle-free cows, and the other was the alteration of the buildings to get the abundance of light and fresh air necessary for maintaining the health of the herd. At the change-over they ceased to buy cows in the ordinary way in the open market. At that time they had 27 head of cattle which were subjected to the tuberculin test, and of these 18 were positive and 9 negative. The 18 were removed from the herd and were disposed of for slaughter as soon as possible. The remaining nine were put into one byre, and the new purchases were put into another byre, the nine non-reactors being sold when they became dry.

The stock at the present time, said Mr. Gofton, consisted of 82 cows. Beginning in the spring of last year they bought as far as they could from tubercle-free herds. They then got heifers which had been grazing out in the open all their days, and never housed, and they had those which were selected tested. That principle proved to be sound, because they had found on subsequent tests that those young heifers had stood up to the test. In building up their herd they had to avoid the introduction of contagious abortion, and therefore, at a very early stage, they subjected all the cows to a blood test for evidence of this infection. They found two, which were at once segregated, and were disposed of where they would be able to do no harm. Further tests were now being made, and he was hoping to be able to say that this troublesome disease had now been eliminated.

Their aim had been to establish an Ayrshire herd, and it was vital that they should breed their own stock and replenish the herd by heifers of their own breeding. They were retaining only the Ayrshire calves, and ultimately these would take the place of the few Friesian, cross, and shorthorn cows that were in the herd. The 65 cows in milk in all stages of lactation were yielding 170 gallons of milk, or an average of 2⅝ per cow per day. Official recording was begun in the beginning of this year and since then 40 cows had been officially recorded, giving an average of 4 per cent. butter fat. Their output to the hospital was almost 152 gallons per day, the reminder of the total production of 170 gallons going to the workers and for calf-feeding.

Mr. Gofton's account of this farm deserves careful study, for it is important that milk supplied to an infectious disease hospital should be free from tuberculous infection, to which children suffering from scarlet fever, measles, and the other exanthems are especially susceptible. Colinton Hospital includes beds and shelters for cases of non-pulmonary tuberculosis, and it would obviously be absurd to provide these with milk which was likely to be infected.

MENTAL HANDICAPS IN LITERATURE.

A BOOK purporting to deal with some of the medico-psychological influences which tend to modify or handicap individuals in their literary efforts should find eager readers. One of the well-known Mental Handicap series,[1] attractively written by Dr. E. M. Cox, is devoted to this subject, and will be welcomed by those who have a taste for inquiry into the medical histories of great writers. The book is divided into eight chapters, of which as many as five are devoted to heredity, alcohol and other narcotics, poverty and affluence, the effect of epochal conditions, and toxæmic conditions. These headings suggest physiological rather than mental handicaps, though it is obviously true that such factors must influence the minds of writers. The author cites Poe and Chatterton as furnishing striking examples of the influence of heredity and environment on literary work and output, and it is true that both men came of neurotic stock. But it is at least probable that but for this stock neither might have written anything above the level of mediocrity. Of the opium-takers, Shelley, Coleridge, De Quincey, Francis Thompson, and Poe are quoted as having consumed narcotics, mostly opium, with profound results upon their works, both in quality and quantity. Coleridge died at the age of 62, and at one time he is said to have consumed two quarts of laudanum a day. Dr. Cox raises the interesting question as to whether the laudanum of the early nineteenth century had as great an alkaloid content as that of the present day.

The chapter on the effect of epochal conditions is one of the best in the book. The author has some happy hits at the literary tendencies of the modernist school. In them, he says, "we find violence exploited to the limits of mental endurance, and, in what is called poetry, we find crudity in expression, distortion in imagination, and often a distressing ignorance of the real value of words, their origins, their significance, and their use." Dr. Cox ascribes these tendencies in part to the ten-year failure to control adolescence after 1914, and believes that much of this violence will subside, and that a recognition of literary culture as something more than a mere defiance of tradition must take place. Of modern psychological views there is little to be found in these pages. Beyond a brief reference to the "inferiority complex," and "neurasthenia," there is no attempt to make more than a superficial analysis of mental handicaps. After all, the reasons for a man being a literary genius and an alcoholic may be the same. The fierce repressive paternal influence in the childhood of the Brontës had more to do with their gloomy brilliance than had any physiological factor. The author himself agrees that the presence of a neurotic strain in the character may itself produce a special intellectual development, and lay the foundation of success in literary work. This view promises more psychology and less physiology, a promise which is not fulfilled; but the little book is likely to stimulate the interest of a wide circle of readers.

BROWN *v.* WHITE BREAD.

To the Editor of THE LANCET.

SIR,—In a recent issue (June 15th, p. 1264) you dealt with the report on the Carbohydrate Value of Foods, issued by the Medical Research Council. This report inquires, "In time of need is it a *national* economy to feed wholemeal bread instead of white? . . . The answer depends on how efficiently the milled off bran can be utilised—e.g., for animal nutrition. . . . It depends upon the coarseness of the bran left with the meal and the amount of it."

The proper answer to this inquiry is given in the Report of the Food (War) Committee of the Royal Society on Digestibility of Breads. In response to a memorial from the Bread and Food Reform League, the Food (War) Committee of the Royal Society carried out important investigations at the Universities of Cambridge, Glasgow, and London bearing upon the effect of raising the scale of extraction of wheat to 90 per cent. and to obtain information as to how far the economical use of the national diet would be affected by changes in the milling standard. The researches made show that bread made from meal ground so that it could *all* pass through a 16-inch mesh wire sieve could be utilised by almost everyone. The bread used was well made, was submitted to clerical and strenuous workers, to women and children—and met with general approval. The important investigations undertaken by the Food (War) Committee of the Royal Society proved, the Report states, that by increasing the extraction of wheat from 80 to 90 per cent. there would be a gain of energy available for man "equivalent to an increase of about

[1] Mental Handicaps in Literature. By Edwin Marion Cox, M.D. With foreword by Theo. B. Hyslop, M.D., F.R.S.E. London: Baillière, Tindall, and Cox, 1929. Pp. 93. 3s. 6d.

1,700,000 calories of energy on the wheat milled each year in this country before the war or enough to extend the cereal supply of energy for more than one month." There would also be a gain of protein "equivalent to an increase of about 90,000 tons of protein on the wheat milled each year in the country."

Calories are, however, a very inadequate gauge of food and nutrition and apt to be misleading. This report from the Royal Society does not deal with the fact that wheat contains essential vitamins and organised mineral substances extracted from wheat in the manufacture of white flour. Digestion experiments show that these phosphates can be assimilated when the meal is finely ground. White flour is an imperfect food deprived of elements necessary for the maintenance of life. Birds fed on it and water have died, whilst those fed on wholemeal and water remained strong and healthy.

The report on Digestibility of Breads, however, enabled the Food (War) Committee to advise the Government to introduce a war bread of 90 per cent. extraction. It was often very badly made, but the nation was thus saved from what the late Mr. Bonar Law stated was the greatest peril encountered during the war—namely, starvation from enemy submarines.

I am, Sir, yours faithfully,

MAY YATES,
Founder and Hon. Secretary, The Bread and Food Reform League.

37, Essex-street, London, W.C.

MEDICINE IN WARTIME.[1]

THE Fourth International Congress of Military Medicine and Pharmacy was held in Warsaw in 1927. A summary of the important conclusions reached, and an account of the hospitable entertainments arranged by the Polish hosts has been set out in a small book which reached us this summer, when the fifth Congress was held in London. The decisions of the Congress are reported at length. In 1927 evacuation of wounded by air took a prominent place in the discussions, and as regarded evacuation generally the Congress decided that only if the high command had in advance fully acquainted the medical staff with its hopes and intentions could the best work be done for the wounded after a battle. As regards epidemic influenza, the best way of limiting an epidemic was thought to be in prompt diagnosis and immediate isolation; staffs of hospitals should be masked. To lessen the serious sequelæ of head wounds it was of first importance to secure that they should heal by first intention. Damage after arsenobenzol injections was thought generally due to unwise selection of the particular drug employed; only those thoroughly understood and approved, and with an arsenic content between 19 and 20 per cent., should be used. This matter was discussed by commissioned pharmacists of continental nations, no officers of similar rank and experience being present from the United States or Great Britain. The dental services took part for the first time in the fourth Congress. This record of an important Congress is in convenient form, and provides a readily available index to the extensive official reports that will be found in the greater libraries.

WOODHALL SPA.

THE Alexandra Hospital is this year supplementing its 34 beds for spa treatment by adding rooms for Plombières douches and for electrical treatment, as well as increasing the accommodation for its nurses. The bathing establishment was kept open throughout last winter for the first time, and the number of patients resorting to its bromo-iodine water has necessitated the provision, adjacent to the Bath House, of a hostel for those more advanced cases who at first find difficulty in reaching the hydropathic and electric treatment rooms, or who require definite nursing care. The need for fuller investigation is being met by the equipment of a pathological department, able to deal with disorders of metabolism, diabetes and the like, for which in this area no means for special treatment exist.

COUVADE.[2]

THE origin is unknown of the curious old custom, known as couvade, which still survives in some parts of the world: there the father lies in after the birth of a child instead of the mother, undergoes dietetic treatment, and receives the congratulations of the family friends. Mr. Dawson sets out the details of a religious rite practised in Cyprus and Ireland, which seems to have the couvade custom as an underlying feature, and proceeds to collect evidence that this custom is known in Europe, Africa, Asia, the Islands, and America. The last part of the book deals with the geographical distribution more fully. The author states that "the recorded localities in which couvade is, or has been, practised correspond to a remarkable degree with those associated with megalithic monuments and with customs usually connected with what has conveniently been called the heliolithic culture-complex, a complex comprising many curious customs and beliefs, amongst which may be specially mentioned sun-worship, mummification, ear-piercing, tattooing, and cranial deformation." Butler appears to have been misled by a story of Marco Polo when he alluded to the couvade in Hudibras:—"For though Chineses go to bed, and lie in, in their ladies' stead"—for the Chinese do not practise couvade, though it occurs in Japan. Incidentally, the reference to Hudibras given by Mr. Dawson (iii., canto i, 70) does not correspond with the lineation in our own copy of that work, where the lines are 707 and 708. The book is well got up, and there is a valuable bibliography; the frontispiece, which curiously enough is taken from a late Chinese manuscript on loan to the Victoria and Albert Museum, shows the couvade. It would be interesting to learn whether the subject was ever made the decorative theme on oriental china such as plates or utensils.

A HEALTH PROPAGANDA.

AMONG the good work which is being done by the Health and Cleanliness Council is the distribution of literature in coöperation with health societies, local authorities and other organisations, forming health propaganda. Last year the Council sent some 5,000,000 of its various booklets and leaflets to 2300 districts in England and Wales, while their publication, "Health and Cleanliness" is used as a text-book by teachers in many schools. The latest publication of the Council is a fairy tale, "On the Arch of the Rainbow," written by Mary Tyreman, its purpose being to inculcate in the minds of children the health value of soap and water and the need for smoke prevention. The book is attractively written and illustrated, and the Health and Cleanliness Council is prepared to distribute from the office, 5, Tavistock-square, London, W.C., a number of copies without charge to teachers, Girl Guide captains, and others interested in the teaching of hygiene among children.

THE NATION AND ITS FOOD.

THE production and distribution of food of the best quality at the very lowest possible price must benefit the community as a whole. People cannot be educated to choose the best kinds of food on which to maintain themselves and their families if such food is beyond their purchasing power. The actual price paid by a consumer for his comestibles includes, of course, the costs of transportation and retailing, and in many foodstuffs these are appreciably greater than the total costs of production. Dr. Addison discusses in a pamphlet[1] recently issued various ways in which the price of food might be reduced. He refuses to believe in the present system, under which we are told that it costs as much to retail a side of beef as it does to rear and feed the animal for three years, and that the expense of transporting and selling a cabbage is two or three times as great as that of cultivating it. If the nation does not deliberately take steps to devise a more rational system of production and marketing, Dr. Addison forsees that our food-supplies will shortly be controlled by huge combines of first-rate business men operating for profit, who will be in a position to dictate the price of all our essential articles of food. He sees no reason why the nation, with its experience of food control during the Great War, should not establish a National Marketing Board which would be furnished with a monopoly of the power of import and the sole right of purchasing for import. One of its main functions would be to keep prices steady for reasonable periods, as far as possible, with the object of encouraging production. It would trade as a responsible business organisation, presenting audited balance sheets to Parliament, and would aim at operating without incurring loss or accumulating profits. The scheme sketched out represents the nationalisation of our food-supplies, and even Dr. Addison suggests that it would be necessary to introduce it gradually, while experience in working out the details is being obtained. Those opposed to any form of nationalisation will obviously disagree with all of the suggested proposals. Nevertheless the fundamental principle of securing the ability of the poorer members of the community to purchase adequate quantities of such protective foods as are at present only too often beyond their means, cannot but be regarded with sympathy.

[1] Report on the Fourth International Congress of Military Medicine and Pharmacy: Warsaw, Poland, 1927. By W. S. Bainbridge, Commander, M.C.-F., U.S. Naval Reserve. The Collegiate Press, Menasha, Wisconsin, U.S.A. Pp. 248.

[2] The Custom of Couvade. By Warren R. Dawson, F.R.S.E. Manchester University Press. 1929. Pp. 118. 7*s.* 6*d.*

[1] The Nation and its Food. By the Rt. Hon. C. Addison, M.D., F.R.C.S. London: Ernest Benn, Ltd. 1929. Pp. 32. 6*d.*